Reports

When local processing increases the appeal of healthy options

Michelle vanDellen a,⁎, Matthew Sanders b, Gráinne M. Fitzsimons c

⁎ Corresponding author at: 417 Chapel Drive, Box 90086, Durham, NC 27708, USA.
E-mail address: michelle.vandellen@duke.edu (M. vanDellen).

A R T I C L E   I N F O

Article history:
Received 10 August 2011
Revised 27 February 2012
Available online xxxx

Keywords:
Self-control
Local and global processing
Self-regulation
Motivation

A B S T R A C T

People often encounter self-control challenges in complex everyday environments in which objects that promote a given goal (e.g., to eat healthily) are mixed together with objects that obstruct that goal. For example, healthy and unhealthy food choices are often mixed together in restaurant menus. Because local processing facilitates attention to low-level details, we expect that it may play an important role in these complex situations. In the present studies, we test the hypothesis that local processing supports self-control when goal items and temptations are contextually paired. As predicted, our findings revealed that local processing (relative to global processing) increased evaluations of healthy items when those items were presented together with unhealthy items. As hypothesized, this effect of local processing only occurred when healthy and unhealthy foods were presented as complementary – not competing – options, suggesting that local processing may increase evaluations of healthy options by decreasing the extent to which individuals accept environmental cues that healthy and unhealthy foods belong together. These findings support recent research demonstrating that despite strong evidence of the advantages of global processing for self-control, local processing may also support self-control efforts in some important everyday situations.

© 2012 Elsevier Inc. All rights reserved.

Introduction

People are faced with countless decisions involving self-control every day. Over time, small decisions that people make between sticking to their goals versus indulging in temptations come to affect their physical health, academic and career success, and interpersonal relationships (Baumeister, 1997; Boals, vanDellen, & Banks, 2011; Mischel, Shoda, & Peake, 1988; Tangney, Baumeister, & Boone, 2004). Often, these self-control dilemmas occur in complex environments in which individuals are faced with both choices that promote higher-order, long-term goals and choices that promote lower-order, short-term goals. For example, when browsing the racks in a department store, the budget-minded consumer encounters both low-priced “save” items and high-priced “splurge” items. Similarly, when walking down the cereal aisle in search of breakfast foods, the health-minded shopper encounters both sugary and sweet cereals alongside healthier bran and wheat cereals. What predicts self-control success in these complex but common situations?

Past work has suggested that these situations cause poor self-control outcomes (Fishbach & Zhang, 2008; Wilcox, Vallen, Block, & Fitzsimmons, 2009). For example, when individuals see healthy foods alongside unhealthy-but-tempting foods, they tend to view these foods as belonging together and are likelier to choose unhealthy food (vs. when the two types of foods are presented separately; Fishbach & Zhang, 2008). Successful self-control requires that individuals avoid this trap, correctly identifying healthy and unhealthy foods as conflicting; doing so encourages individuals to see the healthy food as more desirable (Fishbach & Zhang, 2008).

In the current paper, we build on recent advances in the understanding of local and global processing and self-control (Fujita, Trope, Liberman, & Levin-Sagi, 2006; Schmeichel, Vohs, & Duke, 2011) to posit a novel hypothesis. Namely, we suggest that when items reflecting higher-order and lower-order goals appear together, local processing will promote pursuit of the higher-order goals (i.e., will support self-control). We suggest that when goal items (objects that promote higher-order goals) and temptations (objects that promote lower-order goals) are contextually paired, local processing decreases the extent to which individuals perceive them as complementary and thus leads to more positive evaluations of goal items.

Global vs. local processing and self-control

Building on Construal Level Theory, research in the last decade has demonstrated that local and global processing have distinct consequences for self-control (Fujita & Han, 2009; Fujita et al., 2006). The conclusion of this body of work is that processing information globally, a high-level mode of thinking that is abstract and associated with temporal distance (Trope & Liberman, 2003), promotes self-control. In the seminal program of research illustrating this finding, participants...
performed better on a variety of self-control tasks – from improved delay of gratification to increased physical persistence – if they were processing information globally rather than locally (Fujita et al., 2006). Thus, by focusing individuals on higher-order goals and promoting high-level thinking, global processing increases focus on important goals, allows goal pursuers to inhibit temptations, and increases behavioral consistency with goals (Fujita & Han, 2009; Gollwitzer & Brandstätter, 1997; Markus & Nurius, 1986).

However, in an important exception to the conclusion that global processing facilitates self-control, Schmeichel et al. (2011) found that local processing – the concrete, detail-focused, and temporally immediate counterpart to global processing – can, under certain circumstances, also benefit self-control. Specifically, they found that when tasks require attention to the immediate environment rather than to a higher-order goal, local processing promotes self-control (see also Mann & Ward, 2004). Specifically, local processing enhances performance on a stop-signal task, a classic measure of inhibitory ability requiring attention to environmental cues for inhibition (Schmeichel et al., 2011). In contrast, global processing facilitated self-control on a modified version of the stop-signal involving an additional goal of monitoring the number of stops that had been completed. This work suggests that in some situations, local processing can lead to better self-control than global processing.

**Self-control in complex situations: when temptations and goals complement versus compete**

When goal items and temptations are encountered separately, as they are in research paradigms in which participants are asked to evaluate a single item at a time, people exhibit an automatic tendency to push away temptations and approach goal items (Fishbach & Shah, 2006). Global processing strengthens this tendency, resulting in more negative automatic attitudes toward temptations such as unhealthy foods (Fujita & Han, 2009). In one illustrative study, participants who thought about why they pursued good relationships (a manipulation that fosters high-level conceptual processing), as opposed to thinking about how they pursued good relationships (a manipulation that fosters low-level conceptual processing), more strongly associated candy bars (vs. apples) with negativity in an implicit association task (Fujita & Han, 2009). (Although IATs compare associations to one category versus another, e.g., European-American vs. African-American faces, Greenwald, McGhee, & Schwartz, 1998, participants see and respond to each stimulus one at a time. That is, in any given trial, participants responded to either an apple or a candy bar.) In these situations – when the environment presents goal items and temptations separately – global processing helps individuals evaluate temptations less positively and pursue goals more readily.

However, what about situations like those our budget- and health-minded shoppers face when they simultaneously encounter both goal items and temptations? In the cereal aisle, consumers are exposed to healthy and unhealthy foods presented alongside each other. Models of consumer decision-making, as well as research using process-tracing procedures such as eye-trackers, suggest that these situations differ substantively from ones in which individuals make sequential, separate judgments (Hsee, Loewenstein, Blount, & Bazerman, 1999; Russo & Leclerc, 1994). Research on the dynamics of self-regulation (Fishbach & Zhang, 2008) also suggests that self-control functions quite differently in these kinds of contexts and points to two ways individuals tend to deal with conflicts between higher-order goals (e.g., eating healthfully) and relevant temptations (e.g., enjoying tasty treats). Individuals highlight, consistently choosing items that facilitate the higher-order goal, or they balance, alternating between the higher-order goal and the temptation. When balancing, individuals choose temptations now with the plan of pursuing the goal later, thus succumbing to temptation. This pattern of balancing (preferring temptations now and goal pursuit later) is consistent with a temporal matching pattern; individuals think about what will benefit them in the long-run compared to the short-run (e.g., vegetables have a long-term benefit whereas cookies have a short-term benefit) and match the items temporally (e.g., eating cookies now with the intention of eating vegetables later; Fishbach & Zhang, 2008).

Most relevant to the current research, Fishbach and Zhang (2008) have shown that individuals engage in these dynamics differently depending on the information present in the self-control environment. When temptations and goal items appear separately in two different choice sets (as they do when menus list healthy choices in a separate section or when a grocery store has a special section for health foods), individuals see these choices as competing with each other, which leads to highlighting (choices consistent with higher-order goals). When temptations and goal items appear together in one unified choice set (as they do in the cereal aisle or on many restaurant menus), individuals see these choices as complements to each other, which leads to balancing across the two — choosing indulgence now with the intention of goal pursuit later.

To test the model, Fishbach and Zhang (2008) ran a series of studies in which participants viewed images of healthy and unhealthy foods; these foods were either presented together in a single photograph or separately in two photographs (for an example, see Fig. 1). When the items were presented in separate photographs and thus seemed to compete with each other, participants highlighted the higher-order goal by rating healthy foods more positively. Conversely, when the items were presented together in one photograph and thus seemed to belong together or complement each other, participants balanced, rating unhealthy foods more positively.

In the current research, we examine whether local (vs. global) processing affects this tendency. Specifically, we suggest that local processing leads individuals to contrast goal items and temptations rather than accept the environment’s suggestion that they are complementary or they belong together. Doing so may help individuals avoid the tendency to balance (e.g., defer healthy choices for a later point in time), and thus lead them to evaluate the goal items more positively.

**The current studies**

Thus, the aim of the current paper is to investigate the role of local processing within complex self-control situations, in which goal items and temptations are contextually paired. We hypothesize that local processing will support self-control in these situations, like those encountered while browsing in the cereal aisle or while reading a restaurant menu.

Why would local processing have this beneficial effect? A great deal of research suggests that local processing is associated with a finer-combed and narrower approach to analyzing stimuli than is global processing. For example, global processing increases processing...
of similarities between items whereas local processing increases recognition of differences between items (Förster, 2009). Additionally, future orientation, an element of global conceptual processing, is associated with categorizing objects into fewer and broader groups when compared to present orientation (Liberman, Sagristano, & Trope, 2002). Local processing is also associated with perceiving goals as discordant (Freitas, Clark, Kim, & Levy, 2009), suggesting a tendency to notice that items do not belong together. Finally, local processing has been shown to promote self-control when attention to the stimuli in the environment (vs. inward attention to a high-order goal) predicts success (Schmeichel et al., 2011).

For these reasons, we suggest that when an environment pairs items reflecting multiple goals, local processing will reduce the perception that the items belong together, whereas global processing may increase the likelihood of seeing the items as belonging together—seeing how they complement each other, and seeing both as members of a broader category (of foods, for example). Thus, we suggest that a person processing information locally may be more likely to notice distinctive features separating the items, and therefore be more likely to engage in highlighting, a dynamic of self-regulation that supports self-control.

In the current studies, we focus on one particular domain of self-control, healthy eating. In each study, we create an environmental situation that contains both healthy and unhealthy foods. We expect that when unhealthy and healthy foods are presented together, people processing information locally will more favorably evaluate healthy items than will people processing information globally. In a pilot study, we first investigate whether global vs. local processing influences the occurrence of highlighting and balancing. In Study 1, we then test the hypothesis that when healthy and unhealthy foods are presented together, local processing supports self-control by increasing evaluations of healthy foods. In Study 2, we manipulate the presentation of healthy and unhealthy foods, comparing the effects of local and global processing when the food items appear together versus separately. When the environment suggests that the foods are competing, as it does when healthy and unhealthy foods are presented separately, we do not expect a benefit of local processing. However, when the environment suggests that the foods are complementary, as it does when the items are presented together, we expect local processing to lead to more positive evaluations of healthy foods.

**Pilot study**

The purpose of the pilot study was to test the hypothesis that local processing moderates the effect of presenting healthy and unhealthy food items together and separately. Specifically, we expected that when items were presented as complementary (i.e., simultaneously in the same photograph), local (vs. global) processing would decrease the perception that the items belong together. On the other hand, when items were presented separately, we did not expect local processing to decrease such perceptions relative to global processing.

**Methods**

**Participants**

We recruited 177 (86.96% female) undergraduate students (aged 18 to 25 years) attending a large university in the southeastern United States.

**Procedure**

Following past research (e.g., Waksul & Trope, 2009), we used a Navon letter task to manipulate global vs. local processing (Navon, 1977). Specifically, participants viewed a series of 10 images in which the shape of a larger letter was made up of smaller letters (e.g., the shape of a large F was presented using smaller As). Participants in the local processing condition identified the smaller letter comprising the larger letter whereas participants in the global processing condition identified the larger letter composed of smaller letters.

Next, participants viewed a photograph presenting a healthy (i.e., apple) and an unhealthy food item (i.e., a candy bar) either separately or together (for an example, see Fig. 1). As participants viewed each image they indicated their agreement with the statement “These items belong together” on a scale from 1 (strongly disagree) to 5 (strongly agree).

**Results and discussion**

We used a 2 (global vs. local processing) × 2 (presented together vs. apart) ANOVA to examine the effects of condition on perceiving the items as belonging together. No main effects emerged on ratings of how much the items belonged together. However, as predicted, an interaction between processing type and presentation format emerged, \( F(1, 172) = 6.59, p = .01. \) When items were presented together, participants processing information locally viewed the items as belonging together \( (M = 1.60) \) less than participants processing information globally \( (M = 1.98) \), \( t(172) = 2.19, p = .03. \) However, when items were presented apart, no such effect occurred; participants processing information globally perceived the items as belonging together \( (M = 1.59) \) non-significantly less than participants processing information locally \( (M = 1.88) \), \( t(172) = 1.45, p = .15. \) These findings suggest that local processing leads individuals to be more likely to see healthy and unhealthy items paired together as conflicting—that is, as not belonging together.

**Study 1**

The purpose of Study 1 was to test the hypothesis that local processing supports self-control when items are presented as complementary (i.e., simultaneously in the same photograph). As a preliminary step in identifying the role of local processing in self-control, we focused on evaluations of healthy and unhealthy foods. Although evaluations of healthy and unhealthy foods do not perfectly map on to consumption of healthy and unhealthy foods, research suggests that increasing one’s evaluation of a goal item (or decreasing one’s evaluation of a temptation) is a way that people can prepare themselves to successfully exert self-control (Myrseth, Fishbach, & Trope, 2009), and as such, evaluations of items such as healthy and unhealthy foods are a common measure of motivation and self-control (Ferguson & Bargh, 2004; Fishbach & Zhang, 2008; Moors, De Houwer, & Eelen, 2004). We expected that participants processing information locally would view healthy foods as more appealing than participants processing information globally or control participants.

**Methods**

**Participants**

We recruited 141 (82.27% female) undergraduate students (aged 18 to 25 years) attending a large university in the southeastern United States.

**Procedure**

As in the pilot study, we used the Navon letters task to manipulate local vs. global processing. Participants in a control condition did not complete the letter identification task. Next, participants viewed a series of photographs containing two items, some of which depicted healthy and unhealthy foods. Items were presented in the same photograph because this format implies complementarity (Fishbach & Zhang, 2008). Participants rated each item using a Likert scale ranging from 1 (very unappealing) to 5 (very appealing). Our dependent variables of interest were the average appeal ratings given to healthy foods.
foods (a tomato, strawberries, yogurt, and bran cereal) and unhealthy foods (a cheeseburger, a soft drink, a cookie, and sugary cereal).

Results and discussion

We used a 2 (target: healthy, unhealthy foods) × 3 (processing: global, local, control) mixed ANOVA to examine ratings of the food items. This produced a nonsignificant interaction, \( F(2, 137) = 0.68, p = .51 \). We next evaluated the effects of processing type on healthy and unhealthy foods separately and found a marginally significant omnibus effect of condition on ratings of the healthy food items, \( F(2, 138) = 2.59, p = .08 \). Using planned contrast tests, we examined the differences between participants in the local processing condition and the other conditions. Participants processing information locally rated healthy foods (\( M = 3.71, SD = 0.83 \)) more positively than both participants processing information globally (\( M = 3.42, 0.64 \), \( F(1, 138) = 4.48, p = .05 \), and control participants (\( M = 3.46, SD = 0.71 \), \( F(1, 138) = 3.51, p = .05 \). Participants in the global condition did not differ from participants in the control condition, \( F(1, 138) = 0.05, n.s. \). The processing manipulation did not affect participants’ evaluations of the unhealthy foods, \( F(1, 138) = 0.10, p = .91 \). Participants who were processing information locally viewed unhealthy foods (\( M = 3.44, SD = 1.16 \)) similarly to participants who were processing information globally (\( M = 3.40, SD = 0.96 \)) and participants in the control condition, \( M = 3.50, SD = 0.98 \).

As expected, the difference between local and global processing when evaluating healthy items presented as complementary to unhealthy items was driven by an increase in the local processing condition (vs. control) rather than by a drop in the global processing condition (vs. control). These results suggest that local processing improves evaluations of healthy options when the environment presents them as complementary to unhealthy options.

Study 2

The purpose of Study 2 was to test the hypothesis that local processing benefits self-control only when healthy and unhealthy foods are presented together. In Study 1, all items were presented in one photograph, a situation detrimental for self-control because it encourages individuals to see unhealthy and healthy foods as belonging together (Fishbach & Zhang, 2008). Our pilot data suggest that local processing overrides that tendency when items are presented together but not separately. Therefore, we expected that local processing should fail to produce a relative advantage over global processing when healthy and unhealthy foods were presented separately, and thus already seen as competing (Fishbach & Zhang, 2008). To test this idea, we added a manipulation of presentation format. Based on our initial findings, we expected that when healthy and unhealthy foods were presented together, local processing would support self-control relative to global processing. When healthy and unhealthy foods were presented separately, we expected no benefit of local processing. Indeed, based on prior research (Fujita & Han, 2009; Fujita et al., 2006), we expected that global processing would lead to higher evaluations of healthy items.

Methods

Participants

We recruited 205 undergraduate students (78.54% female) from a large public university in the southeastern United States. All participants were between 18 and 25 years old.

Procedure

Borrowing a method from Förster (2009), participants viewed four maps for 30 s each. The maps presented counties of various shapes marked with basic landmarks (e.g., rivers, highways). Participants in the global condition were instructed to examine the overall shape and depiction of the county whereas participants in the local condition were instructed to examine the details and finer points of the county. Participants were then shown either a picture of a tomato and a cheeseburger together or two separate pictures of the items. Participants were asked to indicate the appeal of each item on a Likert scale ranging from 1 (very unappealing) to 5 (very appealing).

Results and discussion

We used a 2 (target: cheeseburger, tomato) × 2 (processing: global, local) × 2 (presentation format: together, apart) mixed ANOVA to examine the appeal ratings (target was treated as a within–persons variable). A significant three way interaction emerged between target, processing type and presentation format, \( F(1, 201) = 3.82, p = .05 \). As Fig. 2 shows, there was a significant interaction between processing type and presentation format for ratings of the tomato, \( F(1, 201) = 5.90, p = .02 \). When items were presented separately, processing type did not influence evaluations of the tomato, \( t(201) = 0.91, p = .37 \). However, when items were presented together, local processing led to better evaluations of the tomato than did global processing, \( t(201) = 2.63, p = .01 \). The interaction between processing type and presentation format was not significant for ratings of the cheeseburger, \( F(1, 201) = 0.59, p = .45 \).

The results of this study show that the benefit of local processing for self-control occurs only when healthy and unhealthy foods are presented together. When an unhealthy choice was presented separately from a healthy choice, there was no effect of processing type. In short, when healthy and unhealthy options appear to be in conflict, the environment does not trigger scrutiny for individuals processing information locally. We should note that our hypothesis regarding global processing, based on prior research, was not supported. When items were presented separately, local and global conditions did not differ.

General discussion

In the current studies, we provide evidence that local processing produces cognitions that support self-control in complex environments.
in which temptations and goal items are paired together. When the environment accounted for the conflict between healthy and unhealthy foods – that is, when the food items were presented separately – local processing did not produce cognitions that would benefit self-control. However, when the environment presented healthy and unhealthy options as complementary – when the options were shown together, a common situation in everyday life – local processing increased evaluations of healthy options. Rather than leading to the devaluation of unhealthy options, local processing led to an increase in the perceived appeal of healthy foods, suggesting that local processing is consistent with highlighting goal items, a dynamic of self-regulation that supports self-control. In this research, we make the assumption that participants are likely to have either a personal goal to eat healthily or an internalized sense of the cultural value placed on eating healthily. However, not all of the participants in our studies may have actually valued eating healthily. To the extent that people personally care about eating healthily, we expect our observed effects to be increasingly robust.

Together, the findings show that local processing increases evaluations of goal items when those options are contextually paired with temptations. Given that changing evaluations of goals is an important way in which individuals can prepare for self-control success (e.g., Fishbach & Zhang, 2008; Myrseth et al., 2009), and that evaluations are commonly used as proxies for behavior in research on self-regulation (e.g., Ferguson & Bargh, 2004; Fujita & Han, 2009; Myrseth et al., 2009), we believe that our results will likely extend to choice in these complex situations. However, future research should explore how these evaluations are translated into behavioral self-control outcomes.

In the present work, we examined the effects of local and global processing on evaluations of healthy and unhealthy foods. The methods of our studies do not allow for a distinction between conceptual and perceptual processing. For example, by asking participants to examine the small letters comprising a large letter, we asked participants to both process details (a change in conceptual processing) and restricted their scope of vision (a change in perceptual processing). Because we did not use a manipulation exclusively targeted at changing conceptual processing, a conservative conclusion is that the effects we present here are a result of perceptual processing (e.g., visual scope). Although perceptual processing may overlap with and facilitate conceptual processing and vice versa (Förster & Dannenberg, 2010), it is unclear when and how these facility processes occur (Darwent, Fujita, & Waksal, 2010).

The findings we present have interesting theoretical implications as well as practical implications for everyday self-control efforts. First, the findings highlight the complexity of self-control success, and affirm the importance of understanding not just cognitive and motivational states but also how those states are afforded by environmental features. A large body of research has shown that global processing facilitates self-control (Fujita, 2008; c.f. Schmeichel et al., 2011). Although global processing appears to increase self-control when considering temptations separately from goal items (Fujita & Han, 2009), as when a dieter is trying to refrain from indulging while visiting a candy store, local processing may be more helpful when considering conflicting options simultaneously, as when a dieter is in a grocery store. As such, this work supports recent suggestions that processing influences on self-control are more complex than was previously assumed (Schmeichel et al., 2011). Schmeichel and colleagues demonstrated that local processing promotes self-control when attention to the environment – not a higher-level goal – predicts success, as it does in some self-control tasks. Our findings support this notion, showing that local processing promotes self-control in situations that require critical attention to the information provided by the environment.

Second, the findings have implications for research on the dynamics of self-regulation. Local processing appears to reverse the effect of presenting items as complementary or competing. Several laboratory studies (which did not include a manipulation of processing type) have shown that presenting goal items and temptations together leads people to rate goal items as less appealing – and choose them less often – than does presenting them separately (Fishbach & Zhang, 2008). In the current studies, participants processing information locally demonstrated the exact opposite pattern. Healthy options were viewed as more appealing when they were presented together with unhealthy options than when they were presented separately. Because local processing overrides this powerful effect, it may be particularly influential in the many everyday contexts in which goal objects and temptations are presented together.

We have suggested that our findings emerged because local processing leads individuals to be less likely to fall for the environment’s suggestion that goal items and temptations belong together. However, an additional explanation for this effect may be plausible. Local processing draws attention to subordinate features of objects (Liberman et al., 2002; Trope & Liberman, 2010). Reasons against a particular option (i.e., cons) tend to be perceived as subordinate to reasons for that option (i.e., pros; Eyal, Liberman, Trope, & Walther, 2004). Because temptations, relative to goal items, are relevant to immediate desires, situations in which they are paired together may highlight temptation as the dominant choice (Fishbach & Zhang, 2008). In these situations, local processing may increase attention to the subordinate features of the environment and mitigate the balancing dynamic.

In conclusion, the results of our studies indicate that local processing facilitates self-control when items representing higher-order and lower-order goals appear together in the environment. Such instances are common in everyday life. Menus and grocery aisles are not often divided into healthy and unhealthy categories. Instead, menus simultaneously offer both relatively healthy and unhealthy food options, and grocery stores force shoppers to sort through hundreds of options that range in nutritional value. Given the ubiquity of these contexts in everyday life, the current research suggests that local processing may promote successful goal attainment more often than was previously thought. A challenge for future research is to identify how people can effectively harness the benefits of both global and local processing for self-control. Clearly, both global and local processing can benefit self-control. Thinking of weight loss goals before grocery shopping may increase self-control via global processing, but local processing that encourages critical comparisons between items should facilitate self-control as decisions are made on the go in the grocery store aisle.

References


