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To cite this article: L.C. Van Gestel, F.M. Kroese & D.T.D. De Ridder (2018) Nudging at the checkout counter – A longitudinal study of the effect of a food repositioning nudge on healthy food choice, *Psychology & Health*, 33:6, 800-809, DOI: [10.1080/08870446.2017.1416116](https://doi.org/10.1080/08870446.2017.1416116)

To link to this article: <https://doi.org/10.1080/08870446.2017.1416116>



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Accepted author version posted online: 18 Dec 2017.  
Published online: 20 Dec 2017.



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## Nudging at the checkout counter – A longitudinal study of the effect of a food repositioning nudge on healthy food choice

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*(Received 3 July 2017; accepted 4 December 2017)*

**Objective:** The current study is a longitudinal conceptual replication and aimed to investigate the effect of a food repositioning nudge on healthy food choice in a kiosk.

**Design:** During eight weeks, sales data were collected. The former four weeks formed the baseline phase and the latter four weeks formed the nudge phase where healthy food products were repositioned at the checkout counter display, while unhealthy alternatives remained available elsewhere in the store.

**Main Outcome Measures:** The main variable of interest was the proportion of healthy food products (selected to be repositioned) sold per day. Also exit interviews were administered to gather individual level data about purchases, and awareness and opinions of the nudge.

**Results:** Results showed that the proportion of selected healthy food products in total food sales was higher in all four nudge weeks than in all four baseline weeks. Individual level data showed that more customers had bought a selected healthy food product in the nudge phase and that customers generally approved of the nudge.

**Conclusion:** The current study strengthened the empirical evidence base of repositioning healthy food products as an effective and well-accepted nudge.

**Keywords:** nudging; food choices; healthy eating

Imagine a daily commuter routinely buying his regular cup of coffee at the train station. With only three more minutes until his train arrives, his eyes fall on an appetising special deal displayed at the checkout counter. He quickly grabs the deliciously looking chocolate bar and pays by card before running to his train. He only just catches his train, takes a seat, and takes a first sip from his hot coffee. He then unwraps the chocolate bar only to realise he had promised himself to eat healthier.

This example illustrates the precipitate nature of many food decisions made while travelling. Throughout the day, people make numerous food-related decisions, many of which are made automatically (Bargh, 2002), impulsively (Hofmann, Friese, & Wiers, 2008), or habitually (Verhoeven, Adriaanse, Evers, & de Ridder, 2012). In the so-called obesogenic environment (Swinburn, Egger, & Raza, 1999), the environment tends to

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This article was originally published with errors. This version has been corrected/amended. Please see Corrigendum (<http://dx.doi.org/10.1080/08870446.2018.1443714>)

steer food decisions towards unhealthy alternatives. The automatic influences in this environment make it difficult for many people to successfully adhere to a healthy diet (De Ridder, De Vet, Stok, Adriaanse, & De Wit, 2013; de Wit, 2006). This has led to the fact that unhealthy snacks are forming an increasingly large component of daily energy intake (Piernas & Popkin, 2010), even though many people intend to eat healthily (de Ridder, Adriaanse, Evers, & Verhoeven, 2014). Consequently, overweight and obesity are becoming increasingly prevalent and are posing a major public health problem as they increase the risk for many chronic diseases including cardiovascular diseases, diabetes mellitus type 2, and certain types of cancers (NCD Risk Factor Collaboration, 2016; WHO, 2014).

Being en route in an obesogenic environment thus implies being exposed to many temptations, and many people fall for these temptations automatically. It follows that public health interventions aimed at promoting healthy snack purchases should align with the automatic nature of food decisions and should be implemented at the point of purchase. Therefore, scholars and practitioners are now suggesting nudges as a promising intervention to increase healthy consumption (Marteau, Ogilvie, Roland, Suhrcke, & Kelly, 2011).

Nudges have been defined as

any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not. (Thaler & Sunstein, 2008, p. 6)

Acknowledging that many behaviours are not always rational or deliberate (Loersch & Payne, 2011; Strack & Deutsch, 2004), nudges steer behaviour by availing of the cognitive flaws that determine such behaviour (Hansen & Jespersen, 2013). Nudges are designed to facilitate the preferred option by, for example, making it the default or using social norms. Prototypical nudge examples include green footsteps leading towards a bin to facilitate dropping garbage in the bin (Hansen & Jespersen, 2013) and the image of a housefly in the urinal to prevent spilling (Thaler & Sunstein, 2008).

The potential of nudging as a means of changing behaviour has been shown in various domains, such as sustainable behaviour (Pichert & Katsikopoulos, 2008), prosocial behaviour (Croson & Shang, 2008), organ donation (Johnson & Goldstein, 2003), and retirement savings (Madrian & Shea, 2001). In the realm of health behaviour, studies have shown that subtle rearrangements in the choice architecture such as increasing the distance to an unhealthy snack decrease the probability and amount of consumption (Maas, de Ridder, de Vet, & de Wit, 2012), whereas placing healthy food products at the cash register desk increases healthy food choices (Kroese, Marchiori, & de Ridder, 2016). Furthermore, nudges are easy and cheap to implement (Hansen, Skov, & Skov, 2016), making them suitable and appealing to public policy-makers.

A recent meta-analysis has underscored the potential of nudging to increase healthy food decisions (Arno & Thomas, 2016). This meta-analysis showed that nudges lead to an overall increase in healthier food choices by 15.3%, as measured by the change in the frequency of healthy choices or by a change in overall caloric intake. Similar results were found in a systematic review of positional influences on food choice, which revealed a significant and positive effect of the nudge in 16 out of 18 studies (Bucher

et al., 2016). Yet, many systematic reviews unanimously point out that current experimental evidence is based on studies of short duration and that there is a need for studies that investigate the effectiveness of nudging interventions over a longer period of time (Bucher et al., 2016; Hollands et al., 2013; Skov, Lourenco, Hansen, Mikkelsen, & Schofield, 2013). Moreover, it has been suggested that the current evidence base of nudging healthy food choices would be strengthened by repetition of successful nudges at a population-based level (Arno & Thomas, 2016).

### **The current study**

The current study is a longitudinal conceptual replication of the study by Kroese et al. (2016). In this study, healthy food products were placed at the checkout counter of a kiosk. Unhealthy alternatives, which were originally displayed at the checkout counter, were kept readily available in the shop so that freedom of choice remained intact. Results showed that the nudge was effective such that more healthy products were sold in the kiosks where healthy food products had been repositioned than in the kiosk where the healthy food products had not been repositioned. Besides, this study showed that the nudge was well-accepted by customers.

In line with recommendations from the aforementioned meta-analysis and systematic reviews, the current study aims to replicate these results over a longer period of time. While the original study by Kroese et al. (2016) lasted one week, the current study lasted eight weeks in total, of which the former four weeks formed the baseline phase and the latter four weeks formed the nudge phase where healthy food products were repositioned at the checkout counter display. Moreover, in the current study we did not only investigate sales data, but also individual purchase data by administering exit interviews. This was done in order to examine the effectiveness on an individual level next to a group level. Also, customer opinions were queried again in the exit interviews. Besides these advantages of the current study, there were a few more notable differences with the earlier study by Kroese et al. (2016), which resulted from negotiations with the owner of the kiosks. The nudge was implemented in one kiosk (compared to two), at the two most prominent (out of three) checkout counter displays (compared to one display), and a slightly different assortment of healthy products was used.

## **Method**

### ***Design and procedure***

The study was run in one platform-based kiosk at a train station in The Netherlands and had a longitudinal pre-post design. Daily sales data were collected for eight weeks. During the former four weeks (the baseline phase), products were arranged in their regular positions. During the latter four weeks (the nudge phase), a selection of healthy products was placed in two out of three checkout counter displays, thereby replacing a selection of unhealthy snacks which, nonetheless, remained available elsewhere in the same kiosk. The healthy food products that were placed in the display during the nudge phase remained available in their regular positions as well. The two displays that were used were the two most prominent displays right in front of the most frequently used

cash register desk. The third, less prominent, display did not contain any relevant products (i.e. tea bags and chewing gum).

In total, 442 different products were sold in the kiosk, of which 179 were food products. A variety of healthy products was selected to be placed in the display (13 different products), which included bananas, several types of nuts, muesli bars, cereal biscuits and crackers. These selected healthy food products replaced unhealthy food products such as chocolate bars and candy. Meanwhile, other healthy food products (nine different products) were available elsewhere in the kiosk. After having obtained the sales data, the 442 different products were classified as food (179 different products) or non-food (263 different products). Products like candy, snacks and fruit qualified as food products; products like drinks, vouchers, cigarettes, etc. did not. Food products were further classified as healthy (22 different products; e.g. an apple), ambiguous (31 different products; e.g. a cheese sandwich) or unhealthy (126 different products; e.g. a chocolate bar). The primary outcome variable for the statistical analyses of the sales data was the proportion of selected healthy products sold per day as a function of the total number of food products sold per day (where sales data for each day constituted one data point).

### **Customer data**

A subsample of 186 customers (92 in the baseline phase, 94 in the nudge phase) was recruited for participation in an exit interview. Before the start of these exit interviews, the aim of the study was shortly described and customers gave oral consent. No written informed consent was given, because time was limited and participants had to catch the train. The exit interviews were administered during weekdays of the fourth and final week of each phase between 14.00 and 17.00 o'clock and served to obtain individual level purchase data. To this end, participants were asked what product(s) they had just bought. For each product, participants were asked to indicate to what extent they had planned on buying this product in advance and to indicate how often they buy this product when in the kiosk. Both questions were asked on a 10-point Likert scale, ranging from 1 (*not at all*) to 10 (*very much/often*). Afterwards, these products were coded as a selected product or not in accordance with the previously defined list of selected products. The primary outcome of the individual level purchase data was the average number of selected products bought by participants in both phases.

Customers were also asked for their year of birth (from which their age was determined) and their gender was recorded. Importance of healthy eating, levels of hunger and thirst were all asked on a 10-point Likert scale, ranging from 1 (*not at all*) to 10 (*very important/hungry/thirsty*). Furthermore, participants were asked to indicate their frequency of buying something in a kiosk (*never, less than once a month, at least once a month, at least once a week, at least once a day*).

Customers who participated in the nudge phase were also queried for any suspicion of a change in the product arrangement and were subsequently asked for their opinions of the nudge using a funnel debriefing approach. First, they were asked whether they had noticed anything in the kiosk. If participants had noticed something, they were asked to describe what exactly they had noticed. If participants had not noticed something, they were informed that we altered the product arrangement in the kiosk in an attempt to help people make a healthy choice. Second, participants were asked whether they had noticed anything particular regarding this product arrangement, and were asked

to describe what exactly they had noticed. If participants had not noticed something, they were informed that we repositioned healthy options at the checkout counter displays. Subsequently, participants were asked whether they thought the nudge could help them make a healthy choice (*yes/no*) and whether the nudge had influenced their product choice (*yes/no*). Finally, participants were asked to indicate how they felt about this attempt at influencing their product choice (*annoyed/indifferent/good*).

## Results

### *Sales data*

An ANOVA with the experimental phase as independent variable was performed for the total number of products sold per day. This analysis revealed a significant effect,  $F(1, 54) = 5.20$ ,  $p = .027$ ,  $\eta_p^2 = .09$ , such that more products were sold per day during the baseline phase ( $M = 1594.857$ ,  $SD = 216.268$ ) than during the nudge phase ( $M = 1441.321$ ,  $SD = 283.330$ ). A similar effect was found for the total number of *food* products sold per day,  $F(1, 54) = 4.05$ ,  $p = .049$ ,  $\eta_p^2 = .07$ , such that more food products were sold during the baseline phase ( $M = 751.393$ ,  $SD = 121.332$ ) than during the nudge phase ( $M = 675.714$ ,  $SD = 157.616$ ).<sup>1</sup> Taking into account this decrease in the total number of food products sold, the total number of selected healthy food products sold per day was divided by the total number of food products sold per day. In order to investigate the effect of the implementation of the nudge on the relative number of selected healthy food products sold, an ANOVA was performed with the experimental phase as independent variable and the proportion of selected healthy food products sold per day as dependent variable. This analysis revealed a significant effect,  $F(1, 54) = 38.15$ ,  $p < .001$ ,  $\eta_p^2 = .41$ , such that the proportion of selected healthy food products was higher during the nudge phase ( $M = .063$ ,  $SD = .014$ ) than during the baseline phase ( $M = .043$ ,  $SD = .009$ ). At the same time, the proportion of healthy food products which were not replaced did not differ between the experimental phases,  $F(1, 54) < 1$ ,  $p = .349$ . The overall proportion of (replaced and non-replaced) healthy food products relative to all food products sold was higher during the nudge phase ( $M = .093$ ,  $SD = .016$ ) than during the baseline phase ( $M = .076$ ,  $SD = .013$ ),  $F(1, 54) = 18.91$ ,  $p < .001$ ,  $\eta_p^2 = .26$ . Altogether, these findings suggest that the proportional increase in selected healthy food products sold was not at the expense of other healthy food products.<sup>2</sup>

In order to investigate the robustness of the effect, an additional ANOVA was performed with the week number as independent variable and the proportion of selected healthy food products sold per day as dependent variable. This analysis revealed a significant effect of the week number on the proportion of selected healthy food products sold,  $F(7, 48) = 5.34$ ,  $p < .001$ ,  $\eta_p^2 = .44$ . Importantly, post hoc analyses substantiated the above presented difference in the proportion of selected healthy food products sold between the experimental phases, such that (1) the four weeks of the baseline phase did not significantly differ from each other, all  $ps > .318$ , (2) the four weeks of the nudge phase did not significantly differ from each other, all  $ps > .437$ , and finally (3) every single week in the baseline phase differed significantly from every single week in the nudge phase, all  $ps < .036$  (See Figure 1).

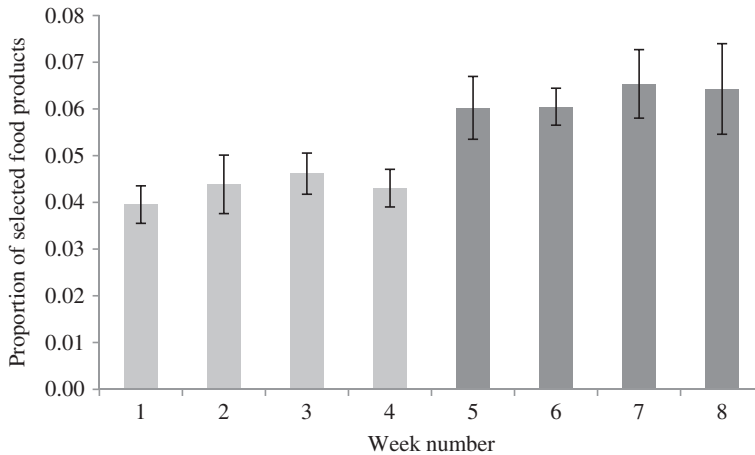


Figure 1. Weekly sales data of the proportion of selected healthy food products as a function of the total number of food products sold. Error bars indicate the standard deviation.

### Customer data

Participants (103 males, 79 females; for four customers gender was not recorded) had an average age of 38.032 years ( $SD = 17.366$ ) and valued healthy eating as relatively important ( $M = 7.546$ ,  $SD = 1.829$ ). On average, participants bought 1.484 products ( $SD = .651$ ), of which .989 ( $SD = .649$ ) were food products. Participants from the exit interviews in the two different phases of the study did not differ from each other in the number of products they had bought, age, hunger, thirstiness, and the importance of healthy eating, all  $ps > .254$ . Chi-squared tests showed that participants also did not differ from each other in gender or in the regularity of going to a kiosk, all  $ps > .107$ .

In line with results from the sales data, the exit interviews revealed that more customers had bought at least one selected healthy food product during the nudge phase (15.96%) than during the baseline phase (5.43%),  $\chi^2 = 5.37$ ,  $p = .021$ ,  $r = .17$ . Similarly, the average number of selected healthy food products purchased was higher during the nudge phase ( $M = .191$ ,  $SD = .470$ ) than during the baseline phase ( $M = .054$ ,  $SD = .228$ ),  $F(1, 184) = 6.36$ ,  $p = .012$ ,  $\eta_p^2 = .03$ . Customers ( $n = 15$ ) who had bought a selected healthy food product during the nudge phase indicated that they had hardly planned on buying these products ( $M = 3.433$ ,  $SD = 2.570$ ), nor did they indicate to frequently buy these products ( $M = 2.967$ ,  $SD = 2.622$ ). Customers ( $n = 63$ ) who had bought a food product which had not been repositioned during the nudge phase indicated that they had somewhat planned on buying these products ( $M = 4.690$ ,  $SD = 3.108$ ), but they also indicated that they do not frequently buy these products ( $M = 2.841$ ,  $SD = 2.144$ ). Altogether, these data reveal an interesting trend which may be suggestive of the working mechanism of the nudge that is assumed to appeal to automatic, impulsive decision-making. Nevertheless, caution is warranted when interpreting these data because of the non-experimental nature and small sample sizes.

Exit interviews further revealed that the nudge was hardly noticed by customers. The majority of the customers indicated to not have noticed anything different (84.9%).

Out of 14 customers who did indicate to notice something different, only one specifically noticed the change in product arrangement. When participants had been notified that ‘some changes were made in the shop to help customers make healthier food choices’, still a large majority of customers (78.5%) indicated to not have noticed anything. Out of 20 customers who did indicate to notice something different, approximately half correctly noticed the change in product arrangement in one way or another. In line with previous results (Kroese et al., 2016), the majority of participants indicated that the nudge could be helpful in making healthier choices (75.0%), but a larger majority stated that it had not influenced their own choice (88.0%). A large majority approved of this kind of nudge, indicating to feel good about this way of stimulating healthy choices (89.1%). None of the customers indicated to feel annoyed about the nudge, while 10.9% felt indifferent about it.

## Discussion

The current study aimed to conceptually replicate previous results by Kroese et al. (2016) over a longer period of time. Results showed that the effect observed by Kroese et al. (2016) – that repositioning healthy food products at the checkout counter display increases the sales of these healthy food products – remained robust over time such that the proportion of selected healthy food products sold during four nudge weeks was higher than during the baseline weeks. The importance of investigating effectiveness over a longer period of time has been emphasised in many systematic reviews (Bucher et al., 2016; Hollands et al., 2013; Skov et al., 2013). In a similar vein, the importance of conceptual replications of studies investigating the effectiveness of nudging healthy food choices has been put forth recently (Arno & Thomas, 2016). The current study addresses both appeals and strengthens the evidence base by replicating previous results over a longer period of time.

The current study further adds that analyses of individual level purchase data lead to similar conclusions, namely that more customers had bought a selected healthy food product during the nudge phase than during the baseline phase, and that customers had bought more selected healthy food products during the nudge phase than during the baseline phase. The proportions of selected healthy food products observed in the exit interviews do not entirely match the proportions observed from sales data, but this is likely to be a result of the time of administering the exit interviews. These interviews were only conducted in the afternoon when people are relatively more likely to buy snack products than their early morning coffee, so these proportions cannot be compared directly. Interestingly, results from the exit interviews tentatively imply that purchasing of the selected healthy food products when displayed in the checkout counter display occurs in an impulsive rather than habitual way.

This study not only replicates that the repositioning nudge is effective in increasing healthy food choices, but also that it is generally approved of by customers. Thereby, the current study reinforces the notion that this kind of nudge is not objected to by customers and may in fact indirectly strengthen the reputation of a company implementing this nudge (Kroese et al., 2016). Given the ethical debate about the acceptability of nudges (Hansen & Jespersen, 2013), the current study provides empirical data about customer opinions as an indication of approval.



Nevertheless, the current study has several limitations. First of all, it should be noted that only one kiosk was used for the current study and that no comparable control kiosk was available in this field study. Second, while the relative increase in the proportion of selected healthy food products sold was substantive (rising from 4 to 6%, hence an increase of almost 50%), in absolute terms the proportion of these products as a function of the total assortment is still rather small. In that light, it is important to consider that merely 13 out of 179 food products were repositioned. An advantage of this modest intervention is that positioning the healthy products at the checkout counter display is practically feasible for vendors and requires little effort to implement. To achieve larger absolute effects, however, it would be interesting to investigate the combined potential of multiple nudges that are implemented simultaneously (e.g. next to placing healthy food products at the checkout counter, one could also think of adjustments in the display of products elsewhere in the store such as placing healthy products at eye-level and/or making unhealthy products less salient). Thus, while this repositioning nudge by itself is not a panacea for public health-related issues, it does show the potential of easy-to-implement and subtle interventions that could be one factor contributing to healthier food choices.

Even though it has been suggested that nudges can be cost-effective (Benartzi et al., 2017) and that they are easy and cheap to implement (Hansen et al., 2016), it is nevertheless important to consider logistical adjustments and financial consequences. For example, it was observed that during some days the bananas (repositioned to the checkout counter display) were slightly overripe, which may have hampered the effect. Placing fresh fruits at the checkout counter requires adequate adjustments to the supply of these products. To make such an intervention financially attractive as well, economists should investigate the financial consequences of such interventions. Even though the decrease in overall food product sales can most probably not be ascribed to the nudge intervention itself, implementing such an intervention might require a different business model. Yet, as indicated above, the current study shows that a nudge intervention may also benefit the reputation of the institution implementing the nudge, as the nudge was generally approved of by the customers participating in the exit interviews.

All in all, the current study strengthens the empirical evidence base of repositioning healthy food products as an effective and well-accepted nudge by showing that this nudge increases sales of the healthy products displayed in the checkout counter display. The observed effect lasted over a period of 4 weeks and thus suggests that the effectiveness of this nudge is sustainable. Lastly, exit interviews revealed that customers generally approve of this nudge in the kiosk, suggesting that the nudge is well-accepted.

### Disclosure statement

No potential conflict of interest was reported by the authors.

### Notes

1. The decrease in the total number of food products sold per day was also found in sales data of other kiosks at the same train station. For one of the kiosks, this decrease was also significant ( $p = .025$ ), while for the other kiosk, this decrease was marginally significant ( $p = .080$ ). As the type of customers, interior, assortment, and arrangement of food products in these

kiosks differed from the kiosk used for the experiment, it was decided a priori not to include these kiosks in the design of the experiment. Nevertheless, sales data from these kiosks suggest that the decrease in product sales found in the kiosk used for the experiment can most probably not be ascribed to the nudge intervention, but is rather a result of general decreasing sales.

2. When investigating the total number of selected healthy food products sold per day in absolute terms, a significant effect of experimental phase was found as well,  $F(1, 54) = 10.34$ ,  $p = .002$ ,  $\eta_p^2 = .16$ , such that more selected healthy food products were sold during the nudge phase ( $M = 43.143$ ,  $SD = 15.316$ ) than during the baseline phase ( $M = 32.464$ ,  $SD = 8.613$ ). There was a marginally significant decrease in the number of healthy food products which were not replaced,  $F(1, 54) = 3.63$ ,  $p = .062$ ,  $\eta_p^2 = .06$ . There was no significant effect of experimental phase on the total number of healthy food products sold per day,  $F(1, 54) = 2.57$ ,  $p = .114$ ,  $\eta_p^2 = .05$ .

## References

- Arno, A., & Thomas, S. (2016). The efficacy of nudge theory strategies in influencing adult dietary behaviour: A systematic review and meta-analysis. *BMC Public Health, 16*, 676.
- Bargh, J. A. (2002). Losing consciousness: Automatic influences on consumer judgment, behavior, and motivation. *Journal of Consumer Research, 29*, 280–285.
- Benartzi, S., Beshears, J., Milkman, K. L., Sunstein, C. R., Thaler, R. H., Shankar, M., ... Galing, S. (2017). Should governments invest more in nudging? *Psychological Science, 28*, 1041–1055.
- Bucher, T., Collins, C., Rollo, M. E., McCaffrey, T. A., De Vlieger, N., Van der Bend, D., ... Perez Cueto, F. J. (2016). Nudging consumers towards healthier choices: A systematic review of positional influences on food choice. *British Journal of Nutrition, 115*, 2252–2263.
- Croson, R., & Shang, J. Y. (2008). The impact of downward social information on contribution decisions. *Experimental Economics, 11*, 221–233.
- De Ridder, D., De Vet, E., Stok, M., Adriaanse, M., & De Wit, J. (2013). Obesity, overconsumption and self-regulation failure: The unsung role of eating appropriateness standards. *Health Psychology Review, 7*, 146–165.
- De Ridder, D., Adriaanse, M., Evers, C., & Verhoeven, A. (2014). Who diets? Most people and especially when they worry about food. *Appetite, 80*, 103–108.
- De Wit, J. B. F. (2006). Maintenance of health behavior change: Additional challenges for self-regulation theory, research and practice. In D. T. D. de Ridder & J. B. F. de Wit (Eds.), *Self-regulation in health behavior* (pp. 193–215). Chichester: Wiley.
- Hansen, P. G., & Jespersen, A. M. (2013). Nudge and the manipulation of choice: A framework for the responsible use of the nudge approach to behaviour change in public policy. *European Journal of Risk Regulation, 4*, 3–28.
- Hansen, P. G., Skov, L. R., & Skov, K. L. (2016). Making healthy choices easier: Regulation vs. nudging. *Annual Review of Public Health, 37*, 237–251.
- Hofmann, W., Friese, M., & Wiers, R. W. (2008). Impulsive vs. reflective influences on health behavior: A theoretical framework and empirical review. *Health Psychology Review, 2*, 111–137.
- Hollands, G. J., Shemilt, I., Marteau, T. M., Jebb, S. A., Kelly, M. P., Nakamura, R., ... Ogilvie, D. (2013). Altering micro-environments to change population health behaviour: Towards an evidence base for choice architecture interventions. *BMC Public Health, 13*, 1218.
- Johnson, E. J., & Goldstein, D. (2003). Do defaults save lives? *Science, 302*, 1338–1339.
- Kroese, F. M., Marchiori, D. R., & de Ridder, D. T. D. (2016). Nudging healthy food choices: A field experiment at the train station. *Journal of Public Health, 38*, 1–5.

- Loersch, C., & Payne, B. K. (2011). The situated inference model: An integrative account of the effects of primes on perception, behavior, and motivation. *Perspectives on Psychological Science*, 6, 234–252.
- Maas, J., de Ridder, D. T., de Vet, E., & de Wit, J. B. (2012). Do distant foods decrease intake? The effect of food accessibility on consumption. *Psychology & Health*, 27, 59–73.
- Madrian, B. C., & Shea, D. F. (2001). The power of suggestion: Inertia in 401 (k) participation and savings behavior. *The Quarterly Journal of Economics*, 116, 1149–1187.
- Marteau, T. M., Ogilvie, D., Roland, M., Suhreke, M., & Kelly, M. P. (2011). Judging nudging: Can nudging improve population health? *British Medical Journal*, 342, 263–265.
- NCD Risk Factor Collaboration. (2016). Trends in adult body-mass index in 200 countries from 1975 to 2014: A pooled analysis of 1698 population-based measurement studies with 192 million participants. *The Lancet*, 387, 1377–1396.
- Pichert, D., & Katsikopoulos, K. V. (2008). Green defaults: Information presentation and pro-environmental behaviour. *Journal of Environmental Psychology*, 28, 63–73.
- Piernas, C., & Popkin, B. M. (2010). Snacking increased among US adults between 1977 and 2006. *The Journal of Nutrition*, 140, 325–332.
- Skov, L. R., Lourenco, S., Hansen, G. L., Mikkelsen, B. E., & Schofield, C. (2013). Choice architecture as a means to change eating behaviour in self-service settings: A systematic review. *Obesity Reviews*, 14, 187–196.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, 8, 220–247.
- Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine*, 29, 563–570.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.
- Verhoeven, A. A., Adriaanse, M. A., Evers, C., & de Ridder, D. T. (2012). The power of habits: Unhealthy snacking behaviour is primarily predicted by habit strength. *British Journal of Health Psychology*, 17, 758–770.
- WHO. (2014). *Global status report on noncommunicable diseases 2014*. Geneva: World Health Organization.