Journal of
Disease Prevention and Health Promotion

Mini-Review

Checkout food environment and healthiness of food choices

Klaus W. Lange[1,2], Yukiko Nakamura[1,2] and Katharina M. Lange[3]

[1]University of Regensburg, Regensburg, Bavaria, Germany; [2]Nara Institute of Science and Technology, Ikoma, Nara, Japan; [3]University of Bath, Bath, Somerset, United Kingdom
Correspondence: Klaus W. Lange, University of Regensburg, 93040 Regensburg, Germany. Email: Klaus.Lange@ur.de
Received: 11 November 2024; **Revised received:** 9 December 2024; **Accepted:** 20 December 2024; **Published:** 31 December 2024
Citation: Lange, K.W., Nakamura, Y., and Lange, K.M. (2024). Checkout food environment and healthiness of food choices. J. Dis. Prev. Health Promot. 8, 13–16.
DOI: 10.5283/jdphp.51

Abstract

The global rise in obesity is a major public health concern. Evidence suggests that environmental factors, including the food environment in grocery stores and supermarkets, contribute to the overconsumption of unhealthy foods and unwanted weight gain. In-store intervention strategies may hold promise in the fight against obesity. One strategy to promote healthier choices is to change the choice architecture of the food environment by placing healthy foods and beverages in highly visible and accessible locations. However, a common food stimulus is the strategic placement of unhealthy foods and beverages at store checkouts to encourage impulse purchases. Available research has shown that prominently displaying healthy food options at supermarket and other store checkouts improves the healthiness of shoppers' food choices. These findings support healthier checkouts as a useful target for public health policy.

Das Lebensmittelumfeld an der Ladenkasse und die Gesundheit der Lebensmittelwahl

Die weltweite Zunahme der Adipositas ist ein großes Problem für die öffentliche Gesundheit. Es gibt Hinweise dafür, dass Umweltfaktoren, einschließlich der Umgebung in Lebensmittelgeschäften und Supermärkten, zu übermäßigem Verzehr ungesunder Lebensmittel und unerwünschter Gewichtszunahme beitragen. Interventionsstrategien in Geschäften sind daher im Kampf gegen Adipositas vielversprechend. Eine Strategie zur Förderung gesünderer Entscheidungen besteht darin, die Architektur des Lebensmittelangebots so zu verändern, dass gesunde Lebensmittel und Getränke an gut sichtbaren und zugänglichen Stellen platziert werden. Die strategische Platzierung ungesunder Lebensmittel und Getränke an den Kassen von Supermärkten und anderen Geschäften ist jedoch ein häufig eingesetzter Anreiz zur Steigerung von Impulskäufen. Die vorliegenden Forschungsergebnisse haben gezeigt, dass eine gut sichtbare Präsentation von gesunden Lebensmitteln an den Kassen von Geschäften dazu beiträgt, dass die Kunden diese Lebensmittel auswählen. Diese Ergebnisse sprechen dafür, dass ein gesünderes Lebensmittelumfeld an Ladenkassen einen sinnvollen Ansatzpunkt für die öffentliche Gesundheitspolitik darstellt.

店舗レジ周辺の食品の環境と健康的な食品選択

世界的に増加している肥満は、公衆衛生において大きな問題である。食料品店やスーパーマーケットの食品環境を含む環境要因が、不健康な食品の過剰消費や不必要な体重増加に関与していることを示す証拠がある。それゆえ店舗内で介入する戦略は、肥満への対抗に役立つかもしれない。より健康的な選択を促進する戦略のひとつは、健康によい食品や飲料を目につきやすくアクセスしやすい場所に配置することで食品を提供するやり方の構造を変えることである。しかしよく見られるのは、衝動買いを促すために不健康な食品や飲料が店のレジ付近に戦略的に配置されていることである。スーパーマーケットやその他店舗のレジに健康的な食品を目立つように陳列することで、買い物客がより健康によい食品を選ぶようになるとの研究報告がすでになされている。これらの知見は、レジ周りの健康的な食品環境が、公衆衛生政策にとって意味のある目標となることを示唆している。

Keywords: Food environment; Food choice; Checkout; Healthy checkout policy; Obesity; Prevention; Public health.

1. Introduction

Obesity is a major global public health problem, with rates increasing dramatically in recent decades. Mean body mass index and prevalence of obesity increased in children, adolescents and adults in many countries worldwide between 1975 and 2016 (NCD Risk Factor Collaboration, 2017). The aetiology of obesity is complex and multifactorial (Foresight, 2007), making it difficult to establish causal pathways. Key factors in the rise of obesity include obesogenic environments, which are the collective influences of opportunities, environments and living conditions that influence dietary behaviour and physical activity at individual and community levels (Swinburn et al., 1999; Swinburn and Egger, 2002; Lake and Townshend, 2006). Being overweight is an adaptive response to an environment that prevents people from making healthy choices and encourages them to become unhealthy. Food scientists, nutritionists, clinicians and psychologists are seeking to understand the role of the food environment in preventing and controlling obesity and to identify environmental interventions for obesity.

Food choices are often influenced by stimuli in people's immediate environment, including the food environment in retail grocery stores and supermarkets. In-store intervention strategies for healthy foods may therefore hold promise in the fight against obesity (Glanz et al., 2012; Adam and Jensen, 2016). Some foods and beverages are strategically placed in stores to encourage unplanned impulse purchases (BMJ, 2012; Cohen and Babey, 2012). For example, unhealthy energy-dense, nutrient-poor products such as sweets, chocolate and crisps, as well as sugar-sweetened and (in some countries, such as Germany) alcoholic beverages, can be found in prominent locations such as at the end of aisles and around checkout areas. Such exposure to unhealthy foods is at odds with obesity prevention and health promotion. Recent evidence suggests that healthy checkout policies have the potential to improve the healthiness of the checkout environment. This article provides a brief overview of the relationship between the checkout environment and the healthiness of food choices.

2. Changing the food environment at the checkout

The display of unhealthy foods and beverages at the checkout of supermarkets and non-food stores, such as book, fashion and toy shops, has attracted attention from the media, advocacy groups and researchers in several countries. The checkout acts as an additional prompt to make last-minute purchases, even if shoppers have not selected these items in the main aisles of the store (Rivlin, 2016). Food placed in the checkout area has been shown to lead to impulse purchases and purchase requests from children (Dixon et al., 2006; Campbell et al., 2014; Thornton et al., 2012), which are difficult for parents to resist (Marshall et al., 2007; Campbell et al., 2014). Many studies have shown that a high proportion of checkout foods tend to be less healthy (Farley et al., 2010; Cohen and Babey, 2012; Miller et al., 2012; Thornton et al., 2013). For example, in the United Kingdom in 2014/2015, around 80% of food sold at the checkout was considered unhealthy (Horsley et al., 2014; Wright et al., 2015). A study of supermarkets, grocery stores and other shops in northern California in 2021 found that most checkout foods and beverages consisted of candy, sugar-sweetened beverages and salty snacks, and did not meet healthy checkout standards (Falbe et al., 2023). Healthier items such as water, nuts and seeds, fruit, vegetables and milk were far less common. In addition, most price promotions at checkouts were for unhealthy foods and beverages (Marinello et al., 2023). As all customers have to go through the checkout, replacing unhealthy products with healthier ones at this point could have an important impact on reducing the purchase and consumption of less healthy foods (Horsley et al., 2014; Barker et al., 2015). As a result, several scientific studies have addressed this issue, and voluntary commitments by supermarkets and policy regulations have been proposed.

In response to consumer concerns and negative media coverage, some supermarkets in the United Kingdom have voluntarily committed to offering healthier foods at their checkouts. In 2015, a UK convenience store chain implemented a healthy checkouts initiative, removing products with high fat, salt or sugar content from checkouts (Fildes et al., 2022). There was a small reduction in sales of less healthy foods, mainly confectionery, following the implementation of the initiative. These results suggest that removing less healthy foods from checkouts may lead to healthier shopping behaviour. However, store compliance was low, suggesting that there is room for improvement. In 2017, a cross-sectional observational study of the number and types of checkout foods was conducted in UK supermarkets with different checkout food policies (Ejlerskov et al., 2018). Supermarkets with clear and consistent policies were found to display significantly fewer checkout foods, and a lower proportion of these were less healthy foods compared to other supermarkets. Furthermore, supermarkets with clear and consistent policies adhered well to them, while those with vague or inconsistent policies appeared to adhere less well (Ejlerskov et al., 2018). These findings suggest that more shops should be encouraged to develop clear and consistent policies on food at the checkout. However, non-voluntary interventions may also be needed.

Interventions in the built environment, including supermarkets and other food retailers, have become increasingly popular in public health nutrition research. Restructuring the environment in which dietary decisions are made can lead consumers to make healthier choices without them being aware of it. One component of this approach is 'nudges', which aim to change behaviour in a predictable way without removing options or significantly altering shoppers' economic incentives (Thaler and Sunstein, 2008). Systematic reviews have found that the majority of nudge interventions focus on providing information, in-store promotion of healthier foods, increasing the availability of healthier foods and pricing (Adam and Jensen, 2016; Slapø et al., 2021).

Several studies have investigated the effects of changing the availability of snacks at supermarket checkouts to encourage healthier purchases. Making healthier foods more convenient or appealing to customers at the checkout was found to increase sales of these products (van Kleef et al., 2012; Sigurdsson et al., 2014), while sales of less healthy foods decreased (Sigurdsson et al., 2014) or remained unchanged (van Kleef et al., 2012). A study conducted in US supermarkets showed that the additional placement of low-calorie drinks and water in checkout coolers with sugary beverages increased purchases of water, while sales of sugary drinks remained unchanged (Foster et al., 2014). A quasi-experimental study observed consumer purchasing behaviour in three supermarkets in the Bronx, New York City (Adjoian et al., 2017). When healthier products, such as nuts, seeds, dried fruits and produce, were available in the checkout lanes, a higher proportion of shoppers purchased healthy items than in the standard checkout lanes. Another quasi-experimental study was conducted in three supermarkets in the southwestern United States, where low-cost fruits and vegetables were placed on checkout lane product displays (Payne and Niculescu, 2018). A significant increase in the purchase of healthy products was found in the experimental supermarkets compared to the control stores. In contrast, another quasi-experimental study examined the impact of healthy snack substitution in supermarket checkout lanes in deprived urban communities in the Netherlands and found no substitution of unhealthy snack purchases with healthier alternatives during the intervention period (Huitink et al., 2020). In conclusion, the results of studies specifically targeting the checkout area are inconsistent, but seem to support the beneficial effects of interventions on dietary behaviour. However, the lack of high-quality studies means that some caution is needed.

In 2021, Berkeley, California, became the first jurisdiction in the world to adopt a healthy checkout policy that sets nutritional standards for foods and beverages in store checkout areas (Berkeley Municipal Code, 2024). The Berkeley Healthy Checkout Ordinance allows only the following foods and beverages at the checkout counter: beverages with no sweeteners (caloric or non-caloric) and foods with 5 g or less of added sugars per serving and 200 mg or less of sodium per serving. It was explicitly stated that excess sugar and sodium consumption increases the risk of non-communicable diseases and that it is in the interest of the health and well-being of the people of Berkeley that large stores offer healthy options and do not actively encourage the purchase of unhealthy foods. About a year after the ordinance was implemented, there were significant improvements in the healthiness of products available at store checkouts (Falbe et al., 2024). In Berkeley, the percentage of all checkout displays that complied with the Healthy Checkout Ordinance increased from 53% before to 83% after implementation. This is a 63% increase over the comparison cities. When only food and beverage checkouts were considered, Berkeley saw an even greater increase in healthy checkouts from 29% to 62%, an increase of 125% compared to other cities. The percentage of unhealthy, non-compliant products fell by about half. Stores replaced unhealthy food and beverage checkout displays, particularly candy and sugar-sweetened beverages, with non-food and non-beverage items, unsweetened beverages and healthy foods such as nuts, seeds, fruits and vegetables (Falbe et al., 2024).

3. Future directions

Several lines of evidence support the introduction of government interventions to improve the food environment and promote healthier food choices. Available research has shown that prominently displaying healthy food options in checkout aisles (and other areas) of supermarkets and other shops improves customers' healthy choices (Anderson et al., 2021; Petimar et al., 2023). Healthy checkout policies have the potential to improve dietary intakes because an estimated 70−80% of food and beverages at store checkouts are unhealthy, most price promotions at checkouts are on unhealthy food and beverages, and all shoppers have to pass through checkouts, which are known to induce impulse purchases. The successful implementation of a healthy checkout policy in Berkeley within one year of the ordinance (Falbe et al., 2024) adds to the evidence for effective and acceptable healthy food policies. These findings support the implementation of healthy placement policies using behavioural economics-based adaptations to the food choice architecture. Healthy placement standards would improve food purchases without interfering with freedom of choice (Thorndike and Sunstein, 2017). In addition, front-of-package labelling policies are supported by numerous studies showing that simple and easily visible labels can help consumers make healthy choices (Hau and Lange, 2023, 2024). Taxation of sugar-sweetened beverages will also help improve the food environment (Andreyeva et al., 2022). But changing the food environment is not enough. The food industry must also contribute by developing healthier, affordable products (Anderson et al., 2019).

4. Conclusion

In-store food marketing can influence food purchasing behaviour and warrants increased attention given the dramatic rise in obesity. Both observational and intervention studies have shown associations between food positioning and the healthiness of food choices. In particular, the balance of healthy and less healthy foods displayed at the checkout has been found to influence shoppers' food choices. The results support healthier checkouts as a useful target for public health policy. Such policies can play an important role in a multi-faceted approach to reducing the incidence of obesity. Other policies include front-of-pack labelling, taxation of obesogenic foods and subsidies for healthier food options. More research is needed on the impact of checkout policies on food purchasing and consumption. Future research is also needed to identify optimal healthier foods at the checkout that can maximise both shoppers' diets and supermarket sales.

Conflict of interest

The authors declared no conflict of interest.

References

Adam, A., and Jensen, J.D. (2016). What is the effectiveness of obesity related interventions at retail grocery stores and supermarkets? A systematic review. BMC Public Health 16, 1247.

Adjoian, T., Dannefer, R., Willingham, C., Brathwaite, C., and Franklin, S. (2017). Healthy checkout lines: a study in urban supermarkets. J. Nutr. Educ. Behav. 49, 615−622.

Anderson, C.A.M., Thorndike, A.N., Lichtenstein, A.H., van Horn, L., Kris-Etherton, P.M., Foraker, R., and Spees, C. (2019). Innovation to create a healthy and sustainable food system: a science advisory from the American Heart Association. Circulation 139, e1025−e1032.

Anderson, E., Wei, R., Liu, B., Plummer, R., Kelahan, H., Tamez, M., Marrero, A., Bhupathiraju, S., and Mattei, J. (2021). Improving healthy food choices in low-income settings in the United States using behavioral economic-based adaptations to choice architecture. Front. Nutr. 8, 734991.

Andreyeva, T., Marple, K., Marinello, S., Moore, T.E., and Powell, L.M. (2022). Outcomes following taxation of sugar-sweetened beverages: a systematic review and meta-analysis. JAMA Netw. Open 5, e2215276.

Barker, D.C., Quinn, C.M., Rimkus, L., Mineart, C., Zenk, S.N., and Chaloupka, F.J. (2015). Availability of healthy food products at check-out nationwide, 2010−2012. A BTG Research Brief. Chicago, IL: Bridging the Gap Program, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago. Available: https://www.cspinet.org/sites/default/files/attachment/BTG_healthy_checkout_brief_Nov2015.pdf. Accessed November 7, 2024.

Berkeley Municipal Code (2024). Chapter 9.82: Healthy checkout. 9.82.050. Available: https://berkeley.municipal.codes/BMC/9.82.050. Accessed November 7, 2024.

BMJ (2012). Chocolate at the checkout is a risk to public health. BMJ 345, e6921.

Campbell, S., James, E.L., Stacey, F.G., Bowman, J., Chapman, K., and Kelly, B. (2014). A mixed-method examination of food marketing directed towards children in Australian supermarkets. Health Promot. Int. 29, 267−277.

Cohen, D.A., and Babey, S.H. (2012). Candy at the cash register − a risk factor for obesity and chronic disease. N. Engl. J. Med. 367, 1381−1383.

Dixon, H., Scully, M., and Parkinson, K. (2006). Pester power: snackfoods displayed at supermarket checkouts in Melbourne, Australia. Health Promot. J. Austr. 17, 124−127.

Ejlerskov, K.T., Stead, M., Adamson, A., White, M., and Adams, J. (2018). The nature of UK supermarkets' policies on checkout food and associations with healthfulness and type of food displayed: cross-sectional study. Int. J. Behav. Nutr. Phys. Act. 15, 52.

Falbe, J., Marinello, S., Wolf, E.C., Solar, S., and Powell, L.M. (2024). Food environment after implementation of a healthy checkout policy. JAMA Netw. Open 7, e2421731.

Falbe, J., Marinello, S., Wolf, E.C., Solar, S.E., Schermbeck, R.M., Pipito, A.A., and Powell, L.M. (2023). Food and beverage environments at store checkouts in California: mostly unhealthy products. Curr. Dev. Nutr. 7, 100075.

Farley, T.A., Baker, E.T., Futrell, L., and Rice, J.C. (2010). The ubiquity of energy-dense snack foods: a national multicity study. Am. J. Public Health 100, 306−311.

Fildes, A., Lally, P., Morris, M.A., Dalton, A., and Croker, H. (2022). Impact on purchasing behaviour of implementing 'junk free checkouts': a pre-post study. Nutr. Bull. 47, 333−345.

Foresight (2007). Trends and drivers of obesity: a literature review for the foresight project on obesity. London: Department of Trade and Industry.

Foster, G.D., Karpyn, A., Wojtanowski, A.C., Davis, E., Weiss, S., Brensinger, C., Tierney, A., Guo, W., Brown, J., Spross, C., Leuchten, D., Burns, P.J., and Glanz, K. (2014). Placement and promotion strategies to increase sales of healthier products in supermarkets in low-income, ethnically diverse neighborhoods: a randomized controlled trial. Am. J. Clin. Nutr. 99, 1359−1368.

Glanz, K., Bader, M.D.M., and Iyer, S. (2012). Retail grocery store marketing strategies and obesity: an integrative review. Am. J. Prev. Med. 42, 503−512.

Hau, R.C., and Lange, K.W. (2023). Can the 5-colour nutrition label “Nutri-Score” improve the health value of food?. J. Future Foods, 306−311.

Hau, R.C., and Lange, K.W. (2024). Learning about good nutrition with the 5-color front-of-package label “Nutri-Score”: an experimental study. Food Sci. Hum. Wellness 13, 1195−1200.

Horsley, J.A., Absalom, K.A., Akiens, E.M., Dunk, R.J., and Ferguson, A.M. (2014). The proportion of unhealthy foodstuffs children are exposed to at the checkout of convenience supermarkets. Public Health Nutr. 17, 2453–2458.

Huitink, M., Poelman, M.P., Seidell, J.C., Pleus, M., Hofkamp, T., Kuin, C., and Dijkstra, S.C. (2020). Can unhealthy food purchases at checkout counters be discouraged by introducing healthier snacks? A real-life experiment in supermarkets in deprived urban areas in the Netherlands. BMC Public Health 20, 542.

Lake, A., and Townshend, T. (2006). Obesogenic environments: exploring the built and food environments. J. R. Soc. Promot. Health 126, 262−267.

Marinello, S., Falbe, J,. Solar, S.E., and Powell, L.M. (2023). Price promotions of foods and beverages sold at food store checkouts. Research Brief No. 130. Policy, Practice and Prevention Research Center, University of Illinois at Chicago. June 2023. Available: https://p3rc.uic.edu/wp-content/uploads/sites/561/2023/07/Marinello_June-2023_RsrchBrf-No.-130_Price-Promo-Foods-Bevs-Sold-at-Food-Str-Chckts.pdf. Accessed November 7, 2024.

Marshall, D., O’Donohoe, S., and Kline, S. (2007). Families, food, and pester power: beyond the blame game? J. Consum. Behav. 6, 164−181.

Miller, C., Bodor, J.N., and Rose, D. (2012). Measuring the food environment: a systematic technique for characterizing food stores using display counts. J. Environ. Public Health 2012, 707860.

NCD Risk Factor Collaboration (2017). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. Lancet 390, 2627−2642.

Payne, C., and Niculescu, M. (2018). Can healthy checkout end-caps improve targeted fruit and vegetable purchases? Evidence from grocery and SNAP participant purchases. Food Policy 79, 318−323.

Petimar, J., Moran, A.J., Grummon, A.H., Anderson, E., Lurie, P., John, S., Rimm, E.B., and Thorndike, A.N. (2023). In-store marketing and supermarket purchases: associations overall and by transaction SNAP status. Am. J. Prev. Med. 65, 587−595.

Rivlin, G. (2016). Rigged: supermarket shelves for sale. Center for Science in the Public Interest. Available: https://cspinet.org/sites/default/files/attachment/Rigged%20report_0.pdf. Accessed November 7, 2024.

Sigurdsson, V., Larsen, N.M., and Gunnarsson, D. (2014). Healthy food products at the point of purchase: an in-store experimental analysis. J. Appl. Behav. Analysis 47, 151−154.

Slapø, H., Schjøll, A., Strømgren, B., Sandaker, I., and Lekhal, S. (2021). Efficiency of in-store interventions to impact customers to purchase healthier food and beverage products in real-life grocery stores: a systematic review and meta-analysis. Foods 10, 922.

Swinburn, B., and Egger, G. (2002). Preventive strategies against weight gain and obesity. Obes. Rev. 3, 289−301.

Swinburn, B., Egger, G., and Raza, F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. Prev. Med. 29, 563−570.

Thaler, R.H., and Sunstein, C.R. (2008). Nudge: improving decisions about health, wealth, and happiness. New Haven CT: Yale University Press.

Thorndike, A.N., and Sunstein, C.R. (2017). Obesity prevention in the supermarket-choice architecture and the supplemental nutrition assistance program. Am. J. Public Health 107, 1582−1583.

Thornton, L.E., Cameron, A.J., McNaughton, S.A., Waterlander, W.E., Sodergren, M., Svastisalee, C., et al. (2013). Does the availability of snack foods in supermarkets vary internationally?. Int. J. Behav. Nutr. Phys. Act. 10, 56.

Thornton, L.E., Cameron, A.J., McNaughton, S.A., Worsley, A., and Crawford, D.A. (2012). The availability of snack food displays that may trigger impulse purchases in Melbourne supermarkets. BMC Public Health 12, 194.

van Kleef, E., Otten, K., and van Trijp, H.C.M. (2012). Healthy snacks at the checkout counter: a lab and field study on the impact of shelf arrangement and assortment structure on consumer choices. BMC Public Health 12, 1072.

Wright, J., Kamp, E., White, M., Adams, J., and Sowden, S. (2015). Food at checkouts in non-food stores: a cross-sectional study of a large indoor shopping mall. Public Health Nutr. 18, 2786−2793.