



**Gamification and Consumer Behaviour: Assessing the Effect of a Game-Based Discount
on Fruit and Vegetable Purchase Intention**

Joline Romea Stolk

SNR. 2133791

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Communication and Information Sciences
Business Communication and Digital Media

School of Humanities and Digital Sciences
Tilburg University, Tilburg

Supervisor: Dr. Tessa van Leeuwen

Second reader: Dr. Ir. Nynke van der Laan

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Abstract

Despite the importance of consuming sufficient fruit and vegetables (F&V), the Dutch population fails to meet national guidelines on F&V intake. This highlights the need for behaviour change to increase F&V purchase and intake. Reward-based gamification might effectively motivate this change. A study was conducted to determine if a price discount won through gamification increases consumers' F&V buying intention compared to a standard or no discount. An online questionnaire was distributed asking participants about their purchase intention of ten different healthy and unhealthy snacks across the three discount conditions (none, standard, gamified), followed by a healthy eating behaviour questionnaire to test the participants' current habits and attitude regarding healthy eating. Results show a positive significant effect of gamified discounts resulting in higher F&V purchase intention than a standard or no discount. Current eating habits enhanced this effect, whereas attitude did not have an impact. Furthermore, a standard discount did not increase F&V purchase intention compared to no discount. Finally, results show a gamified 15% discount is significantly more effective to increase F&V buying intention compared to a standard or gamified 10% or 20% discount. This study suggests that the positive effect of gamification on F&V buying intention might be the consequence of the effort paradox, a psychological theory stating that increased effort leads to increased value. To conclude, this research adds to the existing knowledge of the motivational effects of gamification on buying intention. Additionally, it suggests an intervention to increase the F&V consumption among the Dutch population to aid in meeting the national dietary guidelines.

Keywords: fruit and vegetable purchase intention, gamification, behaviour change, discount

Gamification and Consumer Behaviour: Assessing the Effect of a Game-Based Discount on Fruit and Vegetable Purchase Intention

Eating sufficient fruit and vegetables is a crucial component of a healthy diet. To mitigate the risk of coronary heart disease, stroke, cancer, and diabetes, it is recommended that the Dutch population consume 250 grams of both fruit and vegetables every day (Gezondheidsraad, 2015). However, the majority of the Dutch population does not adhere to the Dutch Dietary Guidelines regarding daily fruit and vegetable (F&V) intake (Cosun Nutrition Center, 2023). Various factors, including cost, educational background, habit strength, and perceptions of health, have been shown to influence F&V consumption (Chapman et al., 2017; RIVM, 2016). The current study will primarily concentrate on the cost determinant, as it is a notable barrier to adequate F&V intake (Chapman et al., 2017). Furthermore, findings from the ‘Nationaal Preventieakkoord’ (Rijksoverheid, 2018) indicate that healthy food needs to be more affordable and accessible in the Netherlands to reduce, among other things, overweight (Kuijper, 2024; SGF, 2024). Given the importance of cost, this research will explore a novel, potential discount intervention to change consumers’ behaviour, leading to an increased F&V purchase.

Currently, often used interventions are standard discounts. However, research has demonstrated that discounts are often unsuccessful in increasing F&V purchase (Nzesi et al., 2023; Waterlander et al., 2012). Therefore, it would be beneficial to explore different interventions that are potentially more effective.

An intervention type that could provide a solution to the aforementioned problem is gamification, which can be defined as “the use of game components, game dynamics, and game mechanics in non-game contexts to make an application, product or service funnier, motivating and engaging” (Santos et al., 2024, p. 2). Within a marketing framework, gamification can stimulate customer engagement (Santos et al., 2024), enhancing customer experience (Pour et al., 2021) and facilitating behaviour change (Johnson et al., 2016; Yoshida-Montezuma et al., 2020). Given this potential of behaviour change, gamification can be a promising intervention to change F&V purchase behaviour.

Previous research has shown that gamification can potentially effectively increase F&V consumption, as previous research has suggested its efficacy in altering consumption-related behaviour (Johnson et al., 2016; Yoshida-Montezuma et al., 2020). More specifically, incorporating the gamification element ‘rewards’ in an intervention generally led to an increase in F&V consumption compared to pre-test measurements (Yoshida-Montezuma et al., 2020). This effect could be, because awards have a positive effect on motivation, which is needed for

behaviour change (Bardach et al., 2024). Additionally, studies have reported positive results for the effect of gamification on health-related behaviour (Johnson et al., 2016). However, it should be stressed that there is little comparison between gamified and non-gamified interventions, and thus, these results need to be considered with caution.

So far, little research has been conducted on gamification as promotional material for adults since research on this topic has mainly focused on children under 18 years of age, presenting a research gap concerning adult populations. So far, the limited research into gamification used for promoting F&V consumption to adults has focused on mobile applications designed to increase motivation and track F&V intake (Buller et al., 2009; Nour et al., 2018). While these applications can successfully inform users about healthy eating behaviour and reinforce their motivation and healthy food-tracking abilities (Nour et al., 2018), they have not demonstrated improvement regarding F&V intake (Buller et al., 2009). Furthermore, to the best of the researcher's knowledge, gamification has not yet been studied in relation to cost manipulation in the context of F&V consumption.

Focussing on the marketing aspect of increasing F&V consumption in relation to gamification, gamification can be seen as an example of pull marketing. In this strategy, customers are encouraged to engage with the brand on their own terms, such as playing a game without feeling forced (Croes, 2024). Focussing on 'winning prices' as a gamification element, it has been suggested that enabling customers to win discounts rather than receive them from the brand boosts sales by 20% (Touchscreen Marketing, 2019). However, this marketing strategy has so far mainly been used with brands selling unhealthy products. Therefore, it raises the question if this gamified intervention would also be effective for healthier products.

Whether a marketing game, such as the above, indeed motivates customers to change their behaviour and increase their F&V purchase, needs to be explored. Behaviour change is needed to modify the current insufficient F&V eating pattern of consumers. The target behaviour of the intervention is an increase in F&V purchase. Due to practical limitations, this study will not directly track customers' real-life purchase behaviour after winning discounts, but instead, an online questionnaire will focus on measuring buying intention. Buying intention can be defined as the plan to buy something (Le-Hoang, 2020). Furthermore, purchase intention interacts with the ability to purchase and actual purchase. More specifically, the stronger the purchase intention, the higher the likelihood of actually making a purchase (Le-Hoang, 2020). Using buying intention as a proxy for purchase behaviour is considered valid when customers are familiar with the product and when product descriptions are detailed (Morwitz et al., 2007).

Since these conditions apply in this study, buying intention will be measured as a proxy for behaviour change and, consequently, F&V purchases.

This study is societally relevant as it aims to suggest an intervention to potentially increase the F&V purchase intention among the Dutch population. Additionally, another important aspect of this study is the benefit it may bring to Dutch supermarkets, as a gamified intervention may facilitate the accomplishment of objectives described in a national agreement. This agreement, known as the ‘Nationaal Preventieakkoord’, was designed to require supermarkets to encourage healthy food consumption. This agreement was signed between, among others, supermarkets and the government, requiring supermarkets to stimulate healthy food consumption. For supermarkets this entails, for example, increasing the amount of discounts on products adhering to the ‘Schijf van Vijf’ (Het Voedingscentrum, n.d.), and promoting F&V consumption. However, currently only two Dutch supermarkets adhere to this agreement (Questionmark, 2020). Given that 70% of food purchases occur in supermarkets, they play an essential role in promoting healthy food. Furthermore, research indicate that consumers tend to make choices that require the least effort (Voois, 2022). This tendency often results in a preference for unhealthy food, especially because it is more frequently discounted than healthy food (Moss, 2013). To improve this, more supermarkets need to engage actively with the objectives of the Nationaal Preventieakkoord and implement improvements to stimulate healthy food choices. However, in the most recent update from Questionmark (2024), it becomes apparent that Dutch supermarkets have not yet reached their objectives, and improvement is crucial. The game proposed in this study could, therefore, potentially contribute towards the goals of supermarkets to promote healthy food choices since it aims to stimulate healthy food consumption.

Furthermore, this study is scientifically relevant because it contributes to the research gap regarding the effects of gamification to promote healthy food rather than unhealthy food via a cost incentive. More specifically, it aims to address the gap in knowledge regarding the effectiveness of a cost-related, gamified intervention on F&V purchase for adults, and contributes to the knowledge gap regarding the comparison of gamified and non-gamified interventions.

In sum, considering the current insufficient F&V consumption among the Dutch population and the reluctance of supermarkets to promote healthy food, combined with the previously mentioned research gaps, the following research question has been formulated:

RQ1: To what extent does a discount won through gamification increase consumers’ buying intention of F&V compared to a standard or no discount?

Theoretical Framework

Decision-making

Decision-making is crucial in grocery shopping, given the abundance of products, brands, and flavours in a supermarket. Given that grocery shopping is cognitively demanding and considering the numerous decisions that need to be made daily, grocery shopping is mostly done subconsciously (Voois, 2022). Therefore, food purchases in supermarkets seem habitual, given that consumers spend, on average, only 22 seconds examining the product before putting it in their basket (Machín et al., 2020). Moreover, consumers tend to choose their usual products without in-store deliberation or comparison with other options (Machín et al., 2020). Habitual food purchases have been studied using a mobile eye-tracker in supermarkets to examine the real-time purchase behaviour of customers (Machín et al., 2020). Based on the habitual nature of food decisions, most customers in the aforementioned research implemented hardly any in-store information search: the eye-tracker research demonstrated that customers did not flip products to read the nutrition label. This ignoring of information could impede healthy food campaigns or providing important nutrition information, given that consumers tend to not notice this information and instead continue to do routine shopping. Therefore, information provision in supermarkets is generally not very successful in helping overcome habitual shopping behaviour and stimulate behaviour change by making new, healthier choices (Machín et al., 2020).

However, when a limited number of customers did compare different products, attention to price was the most relevant aspect related to decision-making (Machín et al., 2020). The attention to price suggests that a habit-breaking intervention focussing on price could have a positive impact on purchase decisions and potentially lead to behaviour change.

Behaviour change

The current consumption patterns of F&V within Dutch society indicate a need for behavioural change. Behaviour change is a complex process with a multitude of aspects playing a significant role. Given the current theoretical models (Michaelsen & Esch, 2021, 2023), motivation and rewards are regarded as the most relevant factors influencing behavioural change in decision-making about healthy food.

First, motivation is a crucial factor in behaviour change, given that it seems to play a key role during the initiation stages of modifying behaviour. Motivation can be defined as the desire to start an action and can be determined in two ways: intrinsic and extrinsic motivation (AlMarshedi et al., 2016). Intrinsic motivation can be specified as the internal desire to do things out of personal interest or enjoyment and for the internal reward it provides, whereas extrinsic

motivation is based on the outcome of actions (Ryan & Deci, 2000). The current thesis focuses primarily on extrinsic motivation since customers are motivated by winning a discount while playing a proposed intervention game. However, previous research has identified that extrinsic motivation might develop into intrinsic motivation over time (Hassan, 2016), which will later be elaborated on.

Secondly, rewards are closely related to motivation since rewards are seen as attractive and provoke positive emotions, which can motivate people to behave a certain way to gain the rewards (Bardach et al., 2024). Additionally, rewards can be viewed as a source of extrinsic motivation that can serve as a starting point to facilitate behaviour change (Bardach et al., 2024).

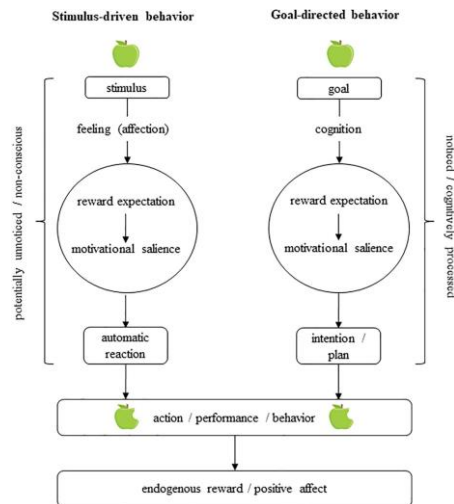
Multiple motivation and reward systems engaged in behaviour change have been identified in previous research: approach, avoidance, and assertion motivation, as well as appetitive, aversive, or assertive reward systems (Michaelsen & Esch, 2021). The paper by Michaelsen and Esch (2021) considers motivation and rewards to be linked, more specifically, it mostly links approach motivation with rewards. To elaborate, the approach motivation focuses on the expectation of a reward, stimuli or goal related to positive experiences (Michaelsen & Esch, 2023). In the current study, approach motivation and appetitive rewards would be the most applicable systems, given that the customer is likely to be motivated by a stimulus and reward: the game and a monetary reward in the form of a discount.

Achieving a reward is generally composed of positive anticipation and linked with a pleasurable feeling. Thus, the core of approach motivation is based on the anticipation and positive emotions obtained by achieving a reward (Michaelsen & Esch, 2023).

Combining motivation and reward mechanisms with health behaviour change theories, a model (Figure 1) distinguishing goal-directed and stimulus-driven behaviour has been composed (Michaelsen & Esch, 2021, 2023). In order to activate the previously explained approach motivation, a positive stimulus or goal is necessary. In this study, the most relevant process of the two proposed in the model is the goal-directed process since it is generally based on an intention or plan and stimuli are cognitively processed, whereas the stimuli are often processed subconsciously in the stimulus-driven process. Subsequently, for goal-directed behaviour, the stimulus or goal leads to reward expectation and motivation, leading to either a deliberate plan to pursue the motivation, respectively. This plan to pursue motivation could cause a behaviour change to the intended behaviour. Conducting the intended behaviour could lead to a reward, which could lead to positive sentiments given the award or goal was obtained, nudging to repeat the intended behaviour (Michaelsen & Esch, 2021).

Figure 1

A simplified depiction of the stimulus-driven behaviour-, and the goal-directed behaviour process by Michaelsen & Esch (2021).



Relating this to the present research, behaviour change is required to alter patterns to include more F&V in society's diet. Behaviour change could be initiated by stimulating a goal-directed plan. In this research, the goal-directed process could be activated when customers see the goal to play a game to win a discount. This situation requires explicit cognitive processing, after which participants can expect a promised reward: points in the game that lead to discounts in the supermarket. This reward creates motivational salience, as customers are likely to engage in the game to earn the discount. Consequently, a goal-directed plan could be developed to play the game and accumulate as many points as possible in pursuit of the goal of obtaining a discount. Once the plan is executed, as illustrated in Figure 1, this could result in the intended behaviour, in this case, an increase in the purchase of F&V and earning the discount as a reward. In this scenario, the final two steps of the model proposed by Michaelsen and Esch (2021) would be conjoined.

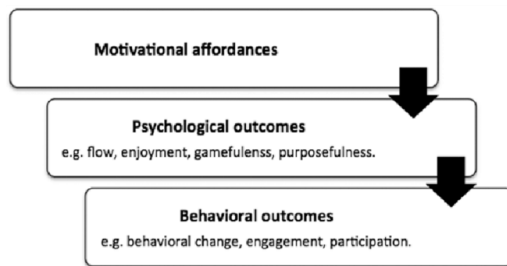
Gamification and behaviour change

Gamification offers the opportunity to connect different types of rewards, such as points or prizes. These rewards can be deployed as extrinsic rewards at the end of the aforementioned goal-directed behaviour path, making gamification a relevant tool to increase motivation. Gamification is known to enhance motivation by increasing enjoyment and engagement given its novelty (Kim et al., 2020). This combination of enjoyment and engagement increases its attractiveness to customers enhancing the chances to be used in supermarkets.

Furthermore, gamification can be defined as a three-step process (Figure 2). In this process, game elements such as points, badges, or leaderboards can be used in (non-game) contexts as motivational affordances to eventually reach behavioural outcomes, for instance, behavioural change (Hamari et al., 2014, as cited in Hassan, 2016).

Figure 2

The process of gamification (Hassan, 2016).



This process starts with motivational affordance, which refers to the intention to affect intrinsic or extrinsic motivation. In the present research, this would mostly refer to approach motivation via a game and opportunity for a monetary reward.

Focussing on the second step, namely the psychological outcomes, the self-determination theory (SDT) becomes relevant. According to self-determination theory, a widely used psychological theory, three basic psychological needs require fulfilment to facilitate motivation: autonomy, competence, and relatedness (Ryan & Deci, 2008). The need for autonomy emphasizes the need to feel agency and control, competence entails the need to experience efficacy and personal growth, and the need for relatedness can be defined as the need to feel meaningfully connected to others (Michaelsen & Esch, 2023).

Placing these needs inside a food context, previous research has argued the following interpretation. Consumers can be motivated to make healthier food choices when their need for competence is fulfilled, for example, by having sufficient cooking and tasting skills. When they feel autonomous to make their own food choices, this can fulfil the need of autonomy. Finally, experiencing a sense of connection to people based on their equally healthy diet, or a connection with nature as a whole because of sustainable, healthy food choices can fulfil the need of relatedness (Schösler et al., 2014).

Applying the SDT to gamification, if the core psychological needs are satisfied through gamification within the first month of using the gamified component, this could predict user enjoyment, engagement and motivation (Rigby, 2015, as cited in Hassan, 2016). According to Hassan (2016), the innate need to have a goal that can be accomplished contributes to fulfilling one of these needs, namely competence: feeling capable and creating the feeling of mastery to

complete a self-concurrent goal successfully. This feeling increases the intrinsic motivational drive of individuals (Hassan, 2016). The combination of mastery and autonomy is crucial for player engagement in games. A feeling of autonomy can be achieved when users perceive they are not under external pressure and do not feel pressured in a particular direction, which could occur when a commercial is intrusive (Huotari & Hamari, 2016). Using gamification is likely less provocative than intrusive commercials, given customers are able to interact willingly rather than feeling pushed. The aforementioned feelings of mastery (purposefulness), autonomy, and engagement could be classified as the psychological outcomes in Figure 2.

Finally, as demonstrated by the SDT (Ryan & Deci, 2000), the accommodated psychological needs (i.e., autonomy and competence) can lead to behaviour change, which is the final step of the gamification process.

This process is utilised in the current study by using the interventional game, combined with its rewards, as a motivational affordance. Playing the game could lead to psychological outcomes such as feelings of enjoyment and, when having successfully earned a discount, feelings of purposefulness (autonomy). Consequently, these psychological outcomes could lead to behavioural outcomes: a behaviour change to purchasing more F&V in the current context.

Duration of behaviour change effect through gamification

Multiple studies corroborate the effectiveness of gamification on behavioural change in general (AlMarshedi et al., 2016; Berger & Schrader, 2016; Johnson et al., 2016; Yoshida-Montezuma et al., 2020; Kim & Castelli, 2021). However, there are different types of gamification, one of which is reward-based. This is the type used in the current research since there is a reward in the form of a discount connected to the game. Reward-based gamification is most effective in stimulating motivation and behaviour change as a short-term intervention (Kim & Castelli, 2021; Nicholson et al., n.d.). This increased effectiveness in short-term interventions can be explained by the fact that reward-based gamification relies on providing an external reward to manipulate behaviour, causing the behaviour change to depend on the reward (Hassan, 2016). More specifically, mostly extrinsic motivation is provoked by including, for example, badges or in-game points, which increase a drive to collect (AlMarshedi et al., 2016; Baah et al., 2023). Users motivated to collect these to obtain rewards are likely to continue with the preferred behaviour as long as the rewards are offered.

However, a crucial aspect of reward-based gamification is that it might reduce long-term behaviour change effects (Nicholson et al., n.d.). Research shows extrinsic rewards could replace intrinsic motivation (Deci & Ryan, 2004; Yang & Li, 2021). More specifically, if the customer already has some intrinsic motivation to engage in the wanted behaviour, this could

be overshadowed or decreased when rewards are used as encouragement instead. When those rewards are removed, the initially present intrinsic motivation might have diminished due to being overshadowed by the extrinsic motivation provided by rewards (Nicholson et al., n.d.). This reduction of intrinsic motivation has been found to create an imbalance between intrinsic and extrinsic motivation, consequently decreasing the positive effects of gamification (John et al., 2023).

However, increasing extrinsic motivation could also be beneficial, given that it can initially boost the intention to engage in the preferred behaviour. Performing the targeted behaviour could make users realise the intrinsic value and rewards resulting from the behaviour change (Hassan, 2016). In the context of F&V consumption and the proposed gamified intervention, consumers would gain extrinsic motivation by collecting points in the proposed game to obtain a discount, which subsequently could motivate the customer to buy F&V. Consequently, the customer might realise the benefits of consuming more F&V and, thus, might develop intrinsic motivation to purchase and consume F&V habitually.

Additionally, it could be argued that gamification also has the potential to generate long-term results, depending on the use and design (Hassan, 2016; Nicholson et al., n.d.). For example, gamification could be applied to facilitate the formation of new habits. More specifically, in the principal stages of new habit learning, rewards are an essential incentive to stimulate repetition of the wanted behaviour (Wood & Neal, 2009). The higher the reward, the more likely the individual will repeat the behaviour (Wood & Neal, 2009; Michaelsen & Esch, 2023). Therefore, gamification can be viewed as a valuable approach in this context.

Gamification and decision-making

In this research, decision-making is one aspect of the buying decision and buying intention process (Munthiu, 2009). Therefore, it is important to consider how gamification potentially affects decision-making before assessing its influence on buying intention.

Gamification and habits

The relationship between habits and gamification is relevant because, as discussed before, food shopping behaviour is generally habitual. As discussed above, in forming consumer habits, rewards can facilitate the repetition of actions that yield desired outcomes (Wood & Neal, 2009). Focusing on reward-based gamification, the abovementioned mechanisms might apply to the current research using gamified elements since these elements mainly include rewards (points and monetary benefit). Similar to the adoption of intrinsic motivation by offering extrinsic motivation, offering rewards can encourage consumers to recognize the rewarding outcomes, motivating customers to repeat the behaviour (Wood &

Neal, 2009). In the current study, the customer would be motivated to play the game and win points by obtaining a discount (reward), causing the purchase of F&V (behaviour) to be repeated.

Gamification and purchase intention

Additionally, multiple studies found a positive correlation between gamification and buying intention (Hildebrand et al., 2014; Hofacker et al., 2016; Högberg et al., 2018). In a grocery shopping framework, purchase behaviour represents the conclusive phase of the consumer decision-making process. Additionally, this research focuses on the final part of the behaviour change process, given that the intended, new behaviour is an increased purchase of F&V. However, as explained previously, measuring actual purchase was not feasible; therefore, buying intention is used as a proxy for behaviour change and actual purchase.

The successfulness of gamification compared to a traditional discount

Discounts on F&V are a promising and commonly employed strategy that has demonstrated effectiveness (Waterlander et al., 2012). Research shows that a 25% discount leads to a significantly higher number of F&V purchases than no discount (Waterlander et al., 2012). Nevertheless, Nzesi et al. (2023) uncovered notable findings indicating that a 30% discount leads to an increase in F&V purchases compared to a 0% discount, while no significant difference was observed between purchases with a 15% or a 0% discount. This suggests a conventional discount does not always guarantee an increased number of purchases. Therefore, it would be interesting to study which discount percentage effectively influences F&V purchase and whether a gamified discount might yield different outcomes.

One mechanism through which gamification might be more effective than a standard discount is because of the effort invested in playing the game. Even though humans usually tend to avoid effort, research shows that effort can also increase value (Inzlicht et al., 2018). Individuals are inclined to value activities or rewards that require a greater investment of effort higher compared to those that do not need such effort (Inzlicht et al., 2018). This phenomenon can be explained using multiple theories. Those most relevant to the present research will be elaborated on.

Sunk cost effect

The sunk cost effect is an economic theory that states consumers are more likely to make (purchase) decisions when money or time has already been invested since this effort or money cannot be returned once a different choice is made (Olivola, 2018). Applying this to the effort paradox, humans are more inclined to consume an option when effort has been invested to acquire it, as to not waste this effort.

In relation to the present research, playing the Snack Catch game to earn a discount requires more effort than solely getting the discount. The extra effort needed to win a discount through the game could be valued more than when it was automatically given, according to the effort paradox and self-perception theory (Inzlicht et al., 2018). Therefore, according to the sunk cost effect, the won discount is probably valued more than a usual discount, which could imply consumers are more inclined to use it since their effort has already been invested (Inzlicht et al., 2018).

Cognitive dissonance and effort justification

Cognitive dissonance arises when a person has two beliefs that are inconsistent with each other, causing a negative feeling (Cooper & Carlsmith, 2015). The effort justification theory is based on this cognitive dissonance assumption and states that rewards are valued more if effort is needed to reduce the discomfort of the effort (Harmon-Jones et al., 2024).

Implementing these theories to the current study, taking the effort and time to play a game before or during grocery shopping could evoke minor negative feelings, causing cognitive dissonance (Harmon-Jones et al., 2024). When a discount is gained, individuals value this reward greatly to compensate and reduce the discomfort of the effort and time spent, increasing the chances of the discount being used (Harmon-Jones et al., 2024).

Confounding variables

Current behaviour

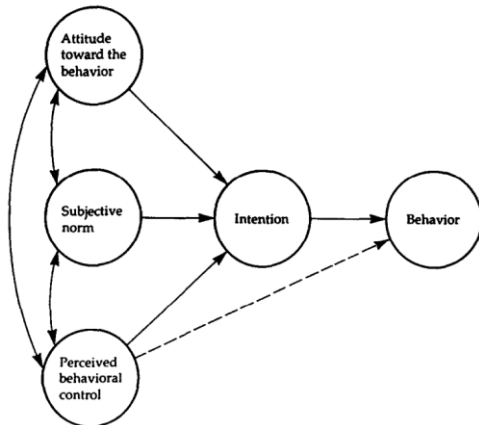
Given the previously mentioned research by Machín et al. (2020) demonstrating the habitual nature of food shopping, it can be expected that current healthy eating behaviour might positively influence F&V buying intention. On the one hand, if a consumer is already eating healthy and buying healthy food products, this behaviour will likely be repeated since food shopping is habitual (Machín et al., 2020). On the other hand, if the customer is used to buying unhealthy food products, this might negatively influence F&V's buying intention, given it can be more challenging to break a habit (Machín et al., 2020). Therefore, the current healthy eating behaviour is speculated to influence buying intention.

Attitude

Subsequently, based on the Theory of Planned behaviour (TPB, Figure 3) (Ajzen, 1991), it can be speculated that attitude toward healthy eating can influence F&V's buying intention. This theory states that attitude (a general evaluation of the behaviour), subjective norm (the opinion of other people), and perceived behavioural control (is the behaviour under your control) influence intention (the motivational state to engage in the behaviour), which consequently influences the behaviour itself.

Figure 3

Theory of Planned behaviour (Ajzen, 1991)



More specifically, using the TPB, it has been suggested that attitude significantly affects buying intention (Alam et al., 2022; Kusdiyanto et al., 2022). If the attitude towards healthy food consumption is positive, the buying intention increases, and conversely (Kusdiyanto et al., 2022). Therefore, the attitude towards healthy eating will likely be a second confounding variable in the present study.

Hypotheses development

Firstly, based on research by Nzesi et al. (2023) and Waterlander et al. (2012) discussing the effectiveness of increasing F&V purchase intention using discounts compared to a no discount condition, it is predicted that:

H1.1: A standard discount leads to higher F&V buying intention than no discount.

Secondly, originating from the gamification process (Hassan, 2016), it seems that gamification elements can affect behavioural change. Moreover, gamification elements have been shown to stimulate extrinsic motivation, potentially leading to behaviour change, which might change the consumers' (probably unhealthy) buying behaviour to purchasing more F&V. Besides, the effort paradox (Inzlicht et al., 2018) suggests a gamified discount could lead to higher purchase intention than a standard discount given the sunk cost effect and the cognitive dissonance theory. Therefore, derived from the effort paradox theory by Inzlicht et al. (2018) and the above-mentioned work of Hassan (2016), it is speculated that:

H1.2: A gamified discount leads to higher F&V buying intention than a standard discount or no discount.

Furthermore, as discussed above, there is reason to believe current healthy eating behaviour and attitude could influence the potential effect of discount type on buying intention

as moderators. Therefore, based on the results of Machín et al. (2020) demonstrating the habitual nature of food shopping, it can be expected that:

H2: If healthy eating behaviour is currently a habit, this increases the positive effect of the gamified condition on F&V buying intention.

Additionally, based on the Theory of Planned Behaviour (Ajzen, 1991) stating the significant effect of attitude on buying intention, it can be argued that:

H3: If the attitude toward healthy eating is positive, this increases the positive effect of the gamified condition on F&V buying intention.

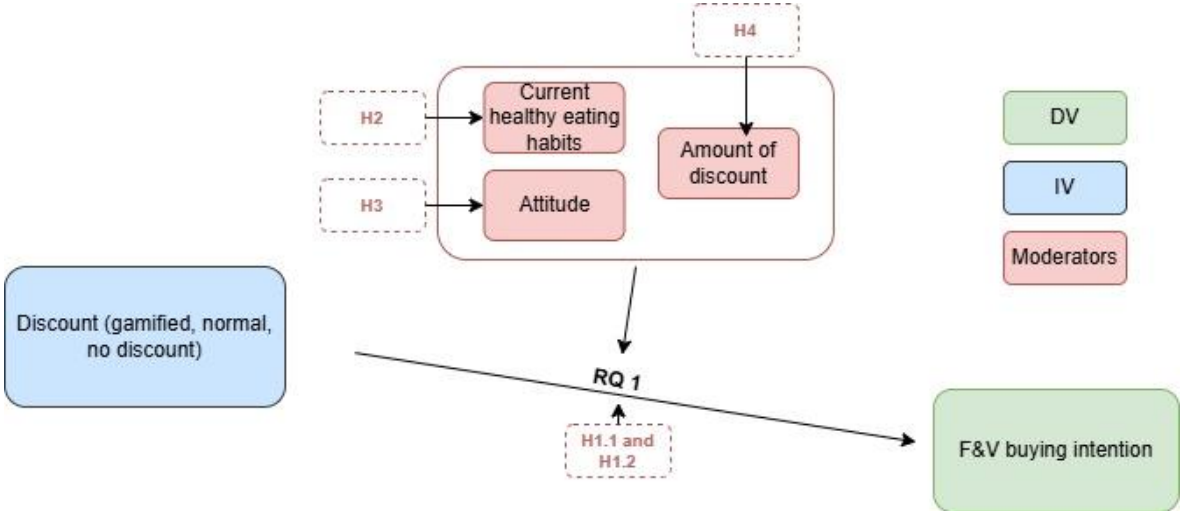
Finally, the effort paradox theory (Inzlicht et al., 2018) combined with the findings of Nzesi et al. (2023) and Waterlander et al. (2012) showing a higher discount is often more effective, the following hypothesis is formulated:

H4: The higher the discount percentage, the stronger the gamified effect on F&V buying intention.

Analytical model

Figure 4

The analytical model for the present study



Methodology

Design

A 3-way (no discount, standard discount, gamified discount) between-subjects design was used to formulate an answer to the above-mentioned research question. The independent variable in this study was discount, which had three conditions: no discount, a standard, given discount and a discount won via a game. The dependent variable was buying intention, serving as a proxy for F&V purchase and behaviour change. Current healthy eating behaviour, attitude, and amount of discount were considered as moderating variables. Additionally, work situation and other demographic variables were included as control variables.

Participants

The participants in this study were Dutch-speaking adults above 18 years old living in the Netherlands, representing the Dutch population that consumes insufficient F&V. Participants were informed to not participate in the study if they were gluten- or lactose intolerant, or if they had a nut allergy since these dietary restrictions restrained them from consuming the snacks mentioned in this study. The current study aimed to have at least 150 participants to be able to estimate a reliable effect. The participants were recruited via social media, given that the Qualtrics survey was distributed through the researcher's (online) network using the snowball sampling method. The participants were not rewarded for their participation.

Data of 243 participants was collected, after excluding 59 participants who did either not complete the survey, or completed the survey after the analysis had already started. The participants were, on average, 39 years old ($SD = 17.17$); 150 participants were female, and 91 were male. The full descriptive statistics summary of participant characteristics can be found in Table 2 in the results section.

Materials

Experimental conditions

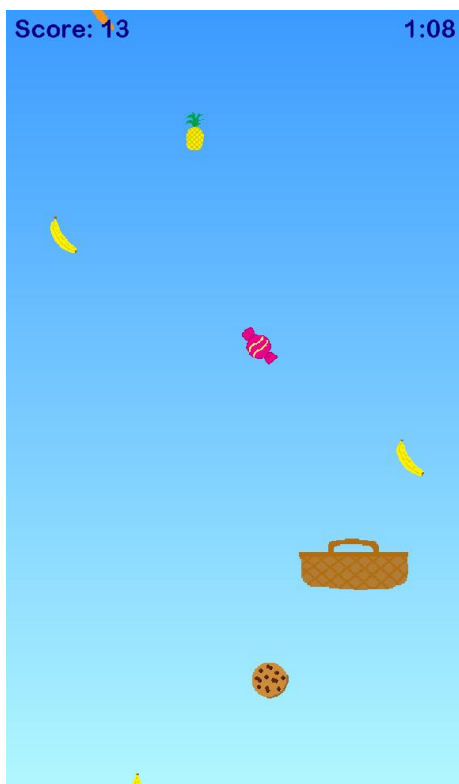
Three experimental conditions were designed to test whether gamification or the discount itself affected buying intention of F&V. These three conditions were manipulated differently and all took place within an online shopping environment.

Gamified discount condition. In the gamified discount condition, participants could access a fruit drop game via a webpage to play and win a discount on F&V. More specifically, the game included fruits, vegetables, and unhealthy snacks being dropped from the top of the screen. The snacks were pictured using small icons of easily recognisable snacks. Examples of unhealthy snacks were a cupcake or a bar of chocolate, and a banana or pineapple represented healthy snacks. The goal of the game was to catch as many healthy snacks (F&V) as possible

while avoiding the unhealthy snacks to collect as many points as possible. The snacks could be caught in a basket, which the player could move left or right by swiping in that direction with their finger. A screenshot of the gameplay can be found in Figure 5. For every healthy snack caught, the score went up by one point, but the score would decrease by one point when an unhealthy snack was caught. When customers scored between 0 and 39 points, they were rewarded with a 10% discount on F&V; when they scored between 40 and 69 points, they received a 15% discount; and with a score of 70 points or higher, a 20% discount was obtained. The participants knew they were playing to earn a discount, however, the exact percentages remained unknown to them until the end. The link to the game can be found in Appendix C.

Figure 5

A screenshot while playing the game 'Snack Catch' during the gamified condition.



Game design. It has been demonstrated that uncertain rewards tend to motivate more than known rewards, as people tend to focus more on the process of obtaining the reward than on the outcome (Hofacker, 2016). Therefore, in the game *Snack Catch*, players know there is an opportunity to win a discount, but the amount remains unknown until the end.

Furthermore, it has been demonstrated that a game has more effective motivating results when the flow of the game is not disrupted. In-game advertising, or a game entirely used to sell, is often viewed as invasive by players (Hofacker, 2016). Therefore, the game was intentionally

designed to not look like an advertisement, to not disrupt the flow of the game, and to increase enjoyment to aim for enhanced effectiveness (Hofacker, 2016).

Additionally, flow is a state in which the difficulty of a task and the skill of the performer are balanced (Csikszentmihalyi, 2014). When this balance is achieved, it can lead to positive gamification outcomes regarding purchase intention (Hofacker, 2016). This is why the game intended to reach a difficulty balancing between challenging and feasible to create flow for the player. A total of six pilot participants were asked to rate the difficulty of the game prior to sending the questionnaire to adjust the degree of difficulty. The external reward of a discount and the specific gamification elements of a challenge were included since these were previously associated with an increased F&V intake in another game context (Yoshida-Montezuma et al., 2020).

The game was designed by the researcher and a second developer with a background in computer science and game development. It was developed using the GameMaker Studio game engine, and the code was written in a special programming language used by the game engine itself, similar to languages like C# and JavaScript.

Standard discount condition. The second type of discount was a pop-up notifying the customer there is a discount on F&V. The pop-up discount could be either a 10%, 15% or 20% discount. The amount was randomized to mimic the same discount as in the gamification condition. This standard discount condition could provide more information on whether customers would buy F&V more quickly when there is a discount, regardless of the presence of the game.

No discount condition. Finally, the third type of discount was no discount at all, which functioned as a control condition that allowed us to gain information on customers' buying intentions when no discount was involved.

Task

The discount conditions were integrated into a Qualtrics survey that imitated a shopping environment. The participants were instructed to evaluate a selection of ten products, rating the likelihood of purchasing each item as a workday snack for the upcoming four days on a 5-point Likert scale ranging from 'very likely' to 'very unlikely'. This task was created to measure F&V buying intention without relying on recipes, as would have been applicable if a task was created around lunch or dinner. The snacks were presented as an image of the product, accompanied by its price, a small description, and discount availability, as seen in the example in Figure 6. The entire snack list can be found in Appendix A (no discount condition) and Appendix B (15% discount condition) The prices were established based on actual prices from

supermarket chain ‘Jumbo’ to ensure that the experimental conditions accurately reflected the current market, even though this meant different prices for healthy and unhealthy snacks. Nevertheless, healthy products were not necessarily always more expensive than unhealthy products (see appendices A and B). Additionally, unit size was strategically selected to correspond with appropriate consumption patterns over four days.

In total, participants were shown ten products, five of which were considered unhealthy and five of which were regarded as healthy. The healthy snacks included apples, baby carrots, cucumbers, grapes, and bananas. All of these fruits or vegetables were selected given their ease to prepare, convenience to bring to work as a snack, and recommended as snacks by Het Voedingscentrum (n.d.). Conversely, the unhealthy snacks consisted of chocolate, gingerbread (ontbijtkoek), biscuits (Sultana), muesli bar, and yoghurt-coated rice cake (yoghurt rijstwafel). These were five of the most common unhealthy snacks among the Dutch population (Mo, 2020; Rijksinstituut voor Volksgezondheid en Milieu, 2021; Voedingscentrum, n.d.).

It is important to note the snacks in the Qualtrics task did not correspond with the snack icons in the game, as the products in the survey may not have been quickly recognisable as healthy or unhealthy, and needed to be realistic instead of too obviously unhealthy such as in the game. For instance, biscuits are usually marketed as healthy, which could make the player in the game doubt whether or not they should catch it. Given that game participants needed to make rapid decisions about whether to catch a snack, distinctive icons in the game were necessary (examples are provided previously and can be seen in Figure 5).

Measures

Buying intention

To measure buying intention (the dependent variable of the study), the participants’ evaluation of the products was checked. As explained, the participants needed to evaluate the likelihood of them buying the item on a 5-point Likert scale. Based on the likelihood, a buying intention score was calculated. The “least likely” option would add zero points to the score, and the “most likely” option would add five points. Therefore, across the five healthy items that were evaluated, a score between 0 and 25 was calculated; the higher the score, the higher the F&V buying intention.

Moderating variables

Furthermore, regarding the potentially moderating variables, the participant was asked about their usual consumption habits and their views on healthy food consumption using a modified and translated version of the ‘The Adolescent Food Habits Checklist’ by Johnson et al. (2002). This modified questionnaire was named the ‘The Snack Habits Checklist’ and can

be found in Appendix D. This data was used to check for a potentially moderating effect of current healthy eating habits and attitude on F&V buying intention.

The questionnaire measuring current healthy eating habits consisted of seven 5-point Likert scale questions (ranging from ‘almost always’ to ‘never’) regarding current healthy eating behaviour. For these questions, another score was calculated: the ‘least likely’ option added zero points to the score, and the ‘most likely’ option five. Therefore, a score between 0 and 35 was calculated. The higher the score, the healthier the current eating habits. To obtain insight into current healthy eating habits, questions like “*I eat at least 250g of vegetables a day*” and “*I usually choose something packaged and unhealthy if I need a snack during the work/study day*” were included. The reliability of the seven items measuring current F&V consumption and snack habits was good: $\alpha = .83$.

Subsequently, the questionnaire measuring attitude consisted of one question: “*I think healthy eating is important*” using a 4-point Likert scale question ranging from ‘completely agree’ to ‘completely disagree’.

Procedure

The data in this study was acquired using a Qualtrics survey. The Qualtrics questionnaire started with an information letter explaining the broad purpose of the study and what would happen with the participant’s data, as well as an informed consent form (can be found in Appendix E). After providing informed consent, general questions followed about the participant's demographics (gender, age, education, and current work situation). Once the participants filled in these questions, a task was presented asking the participants to imagine shopping for their daily snacks. They were asked to evaluate the likelihood of purchasing different snacks for the upcoming four workdays. After this introduction to the task, participants were shown a screen mimicking a supermarket mobile application with a “go to the discounts” screen. Then, the Qualtrics environment distributed the participants among the three different experimental conditions (the no discount, a standard discount, or the gamified discount condition).

When a participant was selected for the gamified discount, they got an explanation telling them a gamified discount was available. Another explanation clarified they were about to play a game for one minute and 15 seconds to win a (to them yet unknown) discount on F&V. Subsequently, they could click on a link leading them to a new browser window displaying the game. After playing the game, the participants were presented with a coloured end screen to show the participant the correct follow-up screen in Qualtrics containing the right discount. The end screen showed the number of points, and the background was either yellow, orange, or

purple, depending on their score. The won discount was not yet visible to the participant to prevent them from filling in a socially accepted score (higher discount percentage) in Qualtrics rather than their true discount percentage. Subsequently, the participants were redirected to the Qualtrics survey and were asked which background colour was visible to them. This would direct them to a screen congratulating them and showing the specific discount percentage they won. Afterwards, Qualtrics directed the participants to the questionnaire with the correct prices depending on the percentage of the discount. Due to practical reasons, it was not an option to automatically transfer the participants to the correct Qualtrics page after they received their score.

If the participants saw one of the other two discount conditions (standard discount or no discount), they were directed from the supermarket application to the next Qualtrics page, similarly to the gamified condition. For the standard discount condition, participants were presented with a screen telling them either a 10%, 15% or 20% discount on F&V was available. This pop-up was a separate Qualtrics screen which appeared after the demographic questions, and before the snack list task. If the participant was in the no discount condition, a screen appeared notifying them no discounts were available. Then, all participants were presented with the ten products, one per page, in a randomized order. In the discounted conditions, the participants saw there was a discount (including the specific percentage) on F&V. An example of the 15% gamified discount can be found in Figure 6. After the buying intention questions had been answered for all ten snack items, the ‘The Snack Habits Checklist’ (Appendix D) was presented. Finally, the participants were debriefed by explaining the study in Qualtrics (Appendix F). The entire experiment took around five minutes to complete.

Data analysis

All the analyses in this research were done using IBM SPSS Statistics 27. First, the means and standard deviations of the descriptive variables were calculated, after which a chi-square test for gender, educational level, and work situation was conducted to test if the distribution among the three experimental groups was homogeneous for all characteristics. Additionally, a one-way analysis of variance with the between-subjects factor age (none, standard, gamified) was performed to measure the homogeneity between groups regarding age.

Furthermore, a one-way analysis of covariance with the between-subjects factor discount condition (none, standard, gamified) and current healthy eating behaviour and attitude as covariates was conducted to test for a potential effect of discount type on F&V buying intention, and to test if the covariates influenced this. Moreover, a follow-up independent samples *t*-test was conducted with discount condition as a between-subjects factor (standard

discount, no discount) to test whether a standard discount leads to higher fruit and vegetable buying intention than no discount.

Finally, a new one-way analysis of covariance with the between-subjects factor discount condition (standard, gamified) and discount percentage as a covariate tested whether discount percentage influenced the potential effect of discount condition on F&V buying intention. This new analysis was necessary since the no discount condition needed to be removed given that there were no discount percentages to compare.

Results

Participants

In total, data from 243 participants has been collected and was used during the analyses. Table 1 shows the distribution of gender, age, highest obtained educational level, and current work situation across participants for the three different experimental conditions.

During the experiment, given the between-subjects design, the participants were divided into three conditions (no discount, standard discount, gamified discount). Tests were conducted to determine if the demographic variables were distributed equally across the participants from the three different groups. A chi-square test for gender, educational level, and work situation, showed a non-significant effect, meaning the distribution among groups was homogeneous for all characteristics (Table 1 shows the analysis results). Furthermore, a one-way analysis of variance with the between-subjects factor age (none, standard, gamified) was performed to measure the homogeneity between groups regarding age. This analysis also showed a non-significant effect, suggesting the participants' age did not differ between the three discount conditions (Table 1 includes the statistics of this result).

Table 1

Sociodemographic characteristics of participants sorted per discount condition, and statistical analyses to determine the equal distribution of demographic variables across groups.

Characteristic	No discount n	Standard discount n	Gamified discount n	Total n	χ^2 / F (df), p
Gender					$\chi^2 = 7.94$ (6)
Female	59	39	44	150	$p = .242$
Male	27	47	25	91	
Prefer not to say	1	0	0	1	
Educational level					$\chi^2 = 6.69$ (16)
Highschool	15	10	9	35	$p = .979$
VMBO	2	2	2	6	
MBO	14	17	12	43	
HBO Bachelor	29	25	18	72	
HBO Master	6	6	5	17	
University Bachelor	8	10	10	28	
University Master	11	14	10	35	
PhD	0	0	2	3	
Other, namely:	2	1	1	4	
‘Huishoudschool’	1	0	0	1	
Executive master	0	1	0	1	
HBO Propedeuse	1	0	1	2	
Work situation					$\chi^2 = 8.95$ (10)
Unemployed, looking for a job	5	3	6	14	$p = .537$
Unemployed, not looking for a job	5	2	2	9	
Side job	19	17	16	52	
Part-time job	17	21	20	58	
Full-time job	39	39	26	104	
Retired	2	4	0	6	
Number of participants	87	86	70	243	
	Mean in years (SD)	Mean in years (SD)	Mean in years (SD)	Mean in years (SD)	
Age	35 (16.08)	41 (17.46)	40 (17.77)	39 (17.17)	$F = 2.40$ (2, 240) $p = .093$

Hypothesis testing

To test hypotheses 1, 2, and 3, a one-way analysis of covariance with the between-subjects factor discount condition (none, standard, gamified) and current healthy eating behaviour and attitude as covariates was performed. This analysis showed a significant main effect of the type of discount on F&V buying intention ($F(2, 238) = 4.22, p = .015, \eta^2 = .035$). This main effect has been followed up with different tests to answer H1.1, H1.2, H2 and H3.

To test the hypothesis that a standard discount leads to higher fruit and vegetable buying intention than no discount (H1.1), an independent samples t -test was conducted with discount condition as a between-subjects factor (standard discount, no discount). The t -test showed no significant difference ($t(166.55) = .521, p = .603$) between a standard discount ($M = 15.67, SD = 4.04$) and no discount ($M = 15.32, SD = 4.82$). Because this test was not significant, H1.1 is rejected.

To follow up on the main effect and to test the hypothesis that a gamified discount leads to higher F&V buying intention than a standard discount or no discount (H1.2), an independent samples t -test showed a significant difference between standard and gamified discounts ($t(153.68) = 3.31, p = .001$). A gamified discount ($M = 17.66, SD = 3.44$) led to a higher purchase intention than a standard discount ($M = 15.67, SD = 4.04$). Additionally, another independent samples t -test revealed a significant difference between no discount and gamified discounts ($t(152.91) = 3.53, p < .001$). In this case, a gamified discount ($M = 17.66, SD = 3.44$) also leads to higher purchase intention than no discount ($M = 15.32, SD = 12.34$). An overview of the means and standard deviations can be found in Figure 7.

Figure 7

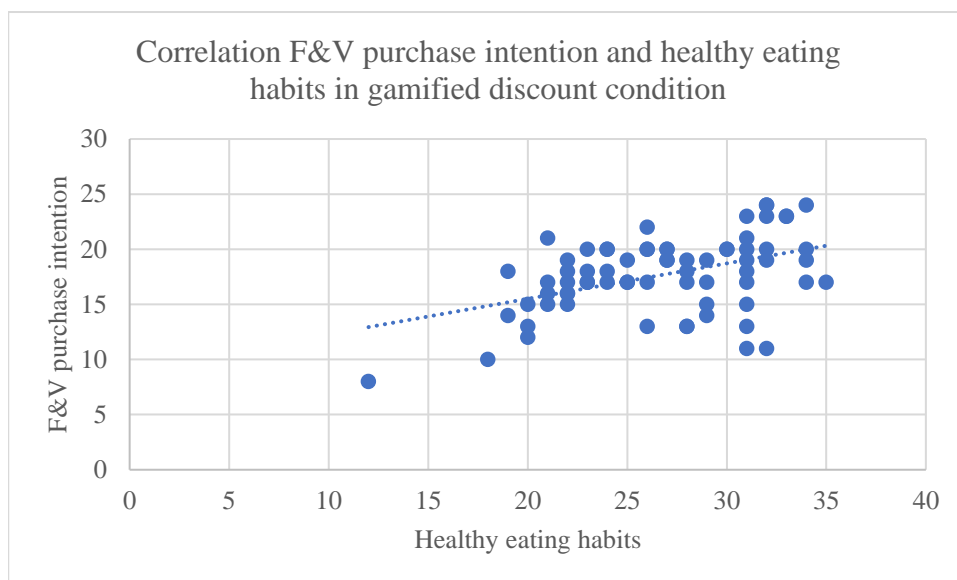
Means of purchase intention sorted per discount condition.



The earlier mentioned ANCOVA was also used to test if the covariate current healthy eating habits increases the effect of the gamified condition on F&V buying intention (H2). This analysis showed that current healthy eating habits have a significant effect on F&V buying intention ($F(1, 238) = 38.86, p < .001, \eta^2 = .140$). More precisely, following up on the significant effect of the covariate, a significant positive correlation was found between healthy eating behaviour and F&V buying intention in the gamified condition ($r = .46, p < .001, n = 70$). In other words, the healthier the current behaviour is, the higher the F&V buying intention in the gamified condition. This correlation can be found in Figure 8.

Figure 8

Correlation plot showing the correlation between F&V purchase intention and healthy eating habits



Finally, to test whether attitude increases the effect of the gamified condition on F&V buying intention (H3), the earlier-mentioned one-way analysis of covariance showed a non-significant effect of attitude on F&V buying intention ($F(1,238) < 1, p = .931$).

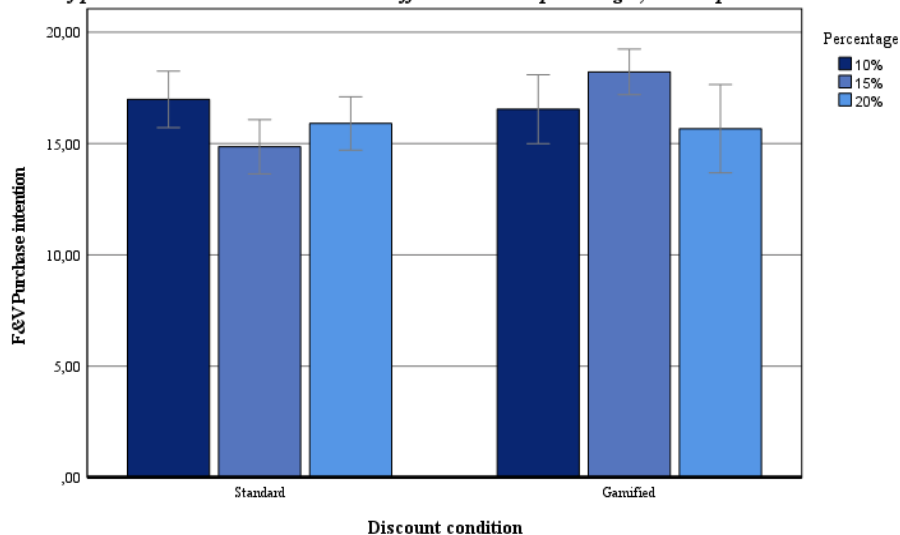
To test hypothesis 4, the higher the discount percentage, the stronger the gamified effect on F&V buying intention, a new ANCOVA analysis was needed because the factor discount percentage (10%, 15%, 20%) was added, and the no discount condition was removed. This exclusion of the no discount condition was necessary given that there are no discount percentages to compare in this condition. The two-way analysis of covariance with the between-subjects factor discount condition (standard discount, gamified discount) and discount percentage (10%, 15%, 20%) and current healthy eating behaviour and attitude as covariates showed an insignificant main effect of discount percentage on F&V buying intention ($F(2, 148) < 1, p = .424$). Additionally, the earlier measured significant main effect of gamification

on buying intention did not last in this test ($F(1, 148) = 2.34, p = .128$). However, there was a significant interaction effect between discount condition and percentage ($F(2, 148) = 5.61, p = .005, \eta^2 = .070$). To follow up on the main effect, three independent samples t -tests were conducted to determine the details of this effect. There was no significant difference between the standard and gamified condition for the 10% ($t(30.64) = -0.184, p = .855$) or 20% ($t(38.30) = -0.306, p = .761$). However, there was a significant difference between the standard 15% and the gamified 15% conditions ($t(55.37) = -4.51, p < .001$). More specifically, a 15% discount in the gamified discount condition led to higher F&V purchase intention ($M = 18.41, SD = 3.17$) than a 15% discount in the standard discount condition ($M = 14.66, SD = 3.61$). These values can also be found in Figure 9.

Figure 9

Means of purchase intention across the three different discount percentages, divided per discount condition

Means of purchase intention across the three different discount percentages, divided per discount condition



Covariates appearing in the model are evaluated at the following values: Attitude = 3,5705, SHC_1tot7 = 25,9551

Error bars: 95% CI

Discussion

In this study, a gamified discount was expected to increase fruit and vegetable (F&V) purchase intention among Dutch participants more than a standard or no discount. Based on the results presented, the answer to the research question, “To what extent does a discount won through gamification increase consumers’ buying intention of F&V compared to a standard or no discount?”, is that, as expected, a gamified discount significantly increases F&V buying intention compared to both the standard and no discount. This effect is moderated by current healthy eating behaviour given that a positive correlation was found between healthy eating habits and the effectiveness of the gamified intervention. Attitude toward healthy eating does not affect F&V's buying intention. Additionally, no significant difference is found between the effect of no discount or a standard discount on F&V buying intention. Finally, buying intention is significantly higher when a gamified 15% discount is used compared to a standard 15% discount. However, there are no significant differences between the standard and gamified 10% or 20% discount conditions. These findings have implications, which will now be discussed.

Effect of a standard discount versus no discount on F&V buying intention (H1.1)

Based on the research by Nzesi et al. (2023) and Waterlander et al. (2012) suggesting a discount is effective in increasing F&V purchase intention, it was hypothesised that a standard discount would lead to higher F&V buying intention than no discount (H1.1). However, the present findings did not demonstrate that a discount increased F&V buying intention, and thus, H1.1 can be rejected. Nzesi et al. (2023) previously found a positive effect of discount on purchase intention when a 30% discount was used, but not with a 15% discount. Similar findings were discussed by Waterlander et al. (2012), namely that only a 25% discount was successful at increasing the number of healthy food purchases, compared to lower percentages. The present research corroborates these findings, namely that a standard discount of 20% or lower does not affect buying intention of F&V. The 10%, 15% and 20% were chosen for the current research regardless of these previous findings, given that supermarkets could be more likely to implement a semi-long-term discount intervention when the percentages are relatively low. However, the findings now suggest, supporting previous research, that these lower percentages are not effective in stimulating a behaviour change.

A possible explanation for the lack of effect could be that even though there is evidence of discounts being successful, it is also known discounts could have negative consequences. For instance, a previous study found that a discount on healthy products not only stimulates healthy food purchases but also increases the purchase of unhealthy products (Epstein et al., 2010, as cited in Waterlander et al., 2012). More specifically, consumers may buy some F&V

in addition to their regular (unhealthier) food purchases: the money saved using a F&V discount is potentially spent buying more unhealthy snacks. Arguably, this could contribute to the current non-significant effect of a 10%, 15%, or 20% discount on F&V purchase intention, given that the likelihood of consumers buying an unhealthy product might have increased with every healthy purchase since money was saved with the F&V purchase. However, given that actual money did not play a role in this hypothetical survey, caution is needed to consider this interpretation. The present findings regarding standard and no discount imply that giving a discount of 20% or lower might be ineffective. Therefore, in order to promote healthier eating habits among the Dutch population, using an alternative intervention in supermarkets might be more successful. For example, higher discount percentages might be more effective. Alternatively, different types of healthy eating campaigns, such as collecting points with every purchase or gamification could be used to promote healthy eating.

Effect of a gamified discount versus a standard or no discount on F&V buying intention (H1.2)

Subsequently, derived from the effort paradox by Inzlicht et al. (2018), it was hypothesised that “A gamified discount leads to higher F&V buying intention than a standard discount” (H1.2). According to the sunk cost effect, consumers are more likely to make a purchase when time has already been invested (Olivola, 2018). In addition, the cognitive dissonance and effort justification theories present that rewards are valued more when effort was needed to reduce the discomfort of the effort (Harmon-Jones et al., 2024). The current research presents findings that are in line with these theories. More specifically, a gamified discount led to higher F&V purchase intentions than no discount or a standard discount. Thus, a discount is indeed more effective when it is won instead of given. This might be due to the effort that has been put in to gain it (although in this study, perceived effort was not measured explicitly). In this case, in order to prevent the effort from being lost, it is more likely that a consumer uses the discount, compared to the situation in which no effort was needed to obtain the discount. Additionally, the won discount could be valued more greatly than a standard discount, since when it is won, the positive feeling gained from the victory compensates the effort that was put in to win it. It could be argued that the more a reward is valued, the more likely its use will be. The current findings on the effectiveness of a gamified discount, and the possible mechanisms explaining these findings suggest that supermarkets could use gamified discounts effectively to stimulate healthy food products. More specifically, gamified interventions are likely to be more successful than standard discounts. Therefore, they could be used as an effective substitute to standard discounts to contribute to the general well-being of

the Dutch population. Additionally, the intervention could aid supermarkets to adhere to the signed ‘Nationaal Preventieakkoord’ with the objectives of providing healthier products and promoting healthy products as opposed to making unhealthy food more accessible. More specifically, when supermarkets would start using gamified discounts, this could contribute to more effective healthy food promotion as opposed to the currently used standard discounts (which have proved to be less effective). Using gamified discounts to promote F&V purchases would thus be more effective in stimulating a higher F&V intake and therefore in achieving the aforementioned objectives of the ‘Nationaal Preventieakkoord’.

Effect of current healthy eating habits on the effect of the gamified condition on F&V buying intention (H2)

Based on research suggesting that food shopping is habitual behaviour (Machín et al., 2010), the following has been hypothesised: “If healthy eating behaviour is currently a habit, this increases the positive effect of the gamified condition on F&V buying intention” (H2). Given the significant results in the present study showing a positive correlation between current healthy eating behaviour and F&V buying intention in the gamified condition, this hypothesis can be accepted. The positive correlation between current behaviour and purchase intention is consistent with previous research suggesting customers tend to confirm their recurrent purchases rather than compare new products (Machín et al., 2010). This could be explained by the habitual nature of food shopping, as proved by multiple studies cited in Machín et al. (2010). It is important to note that the positive effect of gamification on F&V buying intention cannot simply be attributed to participants already having established habits of buying healthy snacks. This conclusion is based on the fact that the variable for current healthy eating habits was included in the ANCOVA analysis as a covariate, but the ANCOVA still showed a significant main effect of discount condition. Nevertheless, it needs to be noted that most participants in this study scored relatively high on the current eating habits score. Moreover, only one participant scored below 14, which was on the lower half of the scale (ranging from 0 to 35).

This finding that habits influence healthy food shopping presents practical implications for interventions promoting healthy food consumption or F&V consumption. More specifically, given that consumers tend to rely on their current healthy eating behaviour, campaigns promoting F&V consumption might be unsuccessful given that consumers will remain in their old, unhealthy habits without taking into account in-store information or campaigns (Rekhy & McConchie, 2014, as cited in Machín et al., 2010). The current study suggests a gamified intervention can influence this, potentially given that its novelty is striking and engaging for customers (Kim et al., 2020), even though most participants in the current research already had

healthy eating habits. Nevertheless, the habitual nature of shopping might also facilitate longer-lasting behaviour change. More specifically, once consumers start adopting the behaviour change through the gamified intervention, this behaviour could potentially become a new habit.

Effect of attitude toward healthy eating on the effect of the gamified condition on F&V buying intention (H3)

Finally, deduced from the results of Alam et al. (2022) and Kusdiyanto et al. (2022), the third hypothesis was formulated: “If the attitude toward healthy eating is positive, this increases the positive effect of the gamified condition on F&V buying intention” (H3). Derived from the results of the present study, showing no significant effect of attitude on F&V buying intention, this hypothesis has to be rejected. These findings contrast earlier results showing a positive correlation between attitude towards healthy food consumption and buying intention (Alam et al., 2022; Kusdiyanto et al., 2022). This result is unexpected, given the numerous studies explaining the effect of attitude on purchase intention (see Ajzen, 1991). It has been speculated that trust mediates the relationship between attitude and purchase intention (Khan et al., 2022). Therefore, the present insignificant effect could potentially be ascribed to a lack of trust, but future research is needed to corroborate this assumption.

Additionally, the lack of a significant effect could also be due to the questionnaire and scale used, the modified version of the Adolescent Food Habits Checklist by Johnson et al. (2002). The original questionnaire and scale have been validated but were designed for adolescents until 16 years old, whereas the participants in the current study were adults above 18 years old. Furthermore, the original question was a yes/no question, whereas it has been modified in the present research to a 4-point Likert scale to be able to give more nuance to the question. In the present research, all except three participants answered the question regarding attitude with “agree” or “completely agree”. This consensus among participants might contribute to the unexpectedly insignificant result. Furthermore, the fact that attitude was measured with only one question could also cause inaccurate results. Given that the original questionnaire did not contain more questions regarding attitude, no more questions were added in the present research. However, measuring a variable with only one question can cause flawed results. Therefore, this needs to be taken into account when considering these results.

Nevertheless, assuming the previously mentioned scale is valid, an implication of attitude not influencing F&V buying intention could be that since attitudes have limited influence on purchase intentions, this lack of influence might facilitate encouraging healthy eating behaviours for people with a negative attitude toward healthy eating. More specifically, consumers do not necessarily need to adopt a positive attitude toward healthy eating in order

for the intervention to be successful. It could be argued that those with a negative attitude towards healthy eating might be the most opposing toward healthy eating. Therefore, it is a positive finding that the present data suggest an attitude switch is not crucial for a behavioural switch. Games are usually perceived as fun and engaging, which suggests people might play them anyway, regardless of their attitude (Kim et al., 2020). Given the limited number of answers with a negative attitude in the present study, the current data cannot corroborate nor deny this suggestion.

Interaction effect between discount percentage and gamified effect on F&V buying intention (H4)

Similar to H1.1, another hypothesis based on the work of Nzesi et al. (2023) and Waterlander et al. (2012) was formulated: “The higher the discount percentage, the bigger the gamified effect of discount condition on F&V buying intention” (H4). In previous research, a higher discount (25% or higher) has proven to be more successful in increasing purchase intention than a lower discount (20% or lower) (Nzesi et al., 2023; Waterlander et al., 2012). However, the present results contradict these findings and have not found significant evidence of a higher discount percentage leading to a bigger gamified effect of discount condition on F&V purchase intention. Instead, the present findings found that gamified discounts of 15% proved to be most successful in increasing F&V buying intention, compared to the 10% or 20% discounts in both conditions (standard and gamified). Therefore, H4 needs to be rejected.

A plausible reason for this effect could be that there is a limit to which the aforementioned effort paradox is valid. In the game presented in this study, it could be considered hard to gain enough points to earn a 20% discount, whereas no great effort was needed to earn a 10% discount. Therefore, it could be the case that a 15% gamified discount was the right balance of effort and reward to yield higher F&V purchase intentions. Moreover, it could be considered too easy to reach the 10% discount and too difficult to reach the 20% discount, leading to no greater purchase intention compared to the standard discount. Nevertheless, it is important to consider there were more participants who earned a 15% discount (40) than participants winning a 20% discount. This could additionally contribute to the (un)significant effect of the different percentages.

These results have practical implications, namely that a supermarket should consider a 15% discount to be most effective. More specifically, when considering this gamified intervention, it might be useful to include a 15% discount to increase its effectiveness. Nevertheless, it could be that different percentages work when the effect comes from the balance between easy and difficult.

Limitations and future research suggestions

Then, several limitations of the current study need to be addressed. First, the present intervention was short-term and one-time, given that previous studies have suggested gamification is most effective on a short-term basis because it relies on the provision of an external reward to cause a behaviour change (Kim & Castelli, 2021; Nicholson et al., n.d.). However, previous research has also proposed gamification can be capable of reaching long-term results when external rewards become internalised (Hassan, 2016; Nicholson et al., n.d.). Gamification can also facilitate the formation of new habits. Especially since the present study showed current healthy eating habits have a moderating effect on the effect of gamification on F&V, future research is necessary to see how effective the currently proposed gamified intervention would be in the long-term and if external rewards, discounts, indeed get internalised in the context of F&V buying intention.

Furthermore, the present survey was conducted online and, although it was set-up to be as realistic as possible, did not involve actual shopping or purchases. It might therefore be interesting to test whether the results would differ if an experiment was conducted in a supermarket, and whether the intervention would still be effective there. Future research is necessary to gain more knowledge on the potential differences regarding the location of the participants (online survey versus in a physical supermarket or in an existing online retail environment).

Another relevant point is the frequency of use of gamified discount interventions. One of the strengths of gamified interventions is their novelty (Kim & Castelli, 2021). However, if gamified discount interventions would substitute all or most regular discounts, it can be questioned whether the effectiveness perseveres or decreases along with the novelty effect. Future research, potentially focussing on more long-term effects, is needed to gain insight into the effects of frequency on gamified discount effectiveness.

Additionally, it might be relevant to study whether the game's duration impacts the effectiveness. On the one hand, it could be argued that the longer the duration of the game, the higher the required effort, the stronger the effect of gamification on F&V buying intention given the effort paradox by Inzlicht et al. (2018). On the other hand, it could be stated that the more time needed during grocery shopping, the less accessible the game is to consumers who are in a hurry to complete their shopping. However, future studies should confirm these assumptions.

Furthermore, regarding the validity of the present research, the current participants generally had healthy current eating habits (the current healthy eating scores ranged between 0 and 35, and only one participant scored below 14, which is the lower half of this range).

Consequently, future research could test a more diverse set of participants to measure if the present results are similar for participants with unhealthier eating habits. Additionally, in the gamified condition, significantly more participants earned a 15% discount (n = 41) compared to a 10% (n = 18) or 20% (n = 11) discount. It might be beneficial for future research to study a more equal distribution across different discount percentages in a gamified context.

Additionally, only one question was asked to measure the covariate ‘attitude’. Therefore, future research is necessary to retest this variable ‘attitude’ with more items measuring this covariate.

Finally, no difference between the three standard discount percentages was found, however, ranging results may occur when higher percentages are used. As explained previously, purchase intention seems to increase more when percentages of 25% or higher are used (Nzese et al., 2023; Waterlander et al., 2012). Therefore, it could be interesting to study the effect of gamified, standard and no discounts with higher discount percentages.

Conclusion

To conclude, a short, gamified intervention with the opportunity to win a discount was more successful in increasing fruit and vegetable buying intention than conditions with a standard discount, or without a discount. This could potentially be due to the effort paradox (Inzlicht et al., 2018), however, future research is necessary to confirm. Furthermore, future research is also necessary to confirm these findings on the long-term and in supermarkets instead of through an online survey to further investigate the successfulness of a gamified discount intervention to stimulate F&V purchase.

In short, this research complements the existing knowledge on the effects of gamification, especially on F&V buying intention. Additionally, it suggests an intervention to aid Dutch society to adhere to the Dutch Dietary Guidelines (Gezondheidsraad, 2015) and to facilitate supermarkets fulfilling their agreement to the ‘Nationaal Preventieakkoord’.

References

- Alam, S. S., Wang, C., Lin, C., Masukujjaman, M., & Ho, Y. (2022). Consumers' buying intention towards healthy foods during the COVID-19 pandemic in an emerging economy. *Cogent Business & Management*, 9(1).
<https://doi.org/10.1080/23311975.2022.2135212>
- AlMarshedi, A., Wanick, V., Wills, G. B., & Ranchhod, A. (2016). Gamification and behaviour. *Gamification, Progress in IS* (pp. 19–29). https://doi.org/10.1007/978-3-319-45557-0_2
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-t](https://doi.org/10.1016/0749-5978(91)90020-t)
- Baah, C., Govender, I., & Subramaniam, P. R. (2023). Exploring the role of gamification in motivating students to learn. *Cogent Education*, 10(1).
<https://doi.org/10.1080/2331186x.2023.2210045>
- Bardach, Lisa & Murayama, Kou. (2024). The Role of Rewards in Motivation--Beyond Dichotomies. 10.31219/osf.io/hgbw4.
- Bem, D. J. (1972). Self-Perception Theory. *Advances in experimental social psychology* (pp. 1–62). [https://doi.org/10.1016/s0065-2601\(08\)60024-6](https://doi.org/10.1016/s0065-2601(08)60024-6)
- Berger, V., & Schrader, U. (2016). Fostering Sustainable Nutrition Behavior through Gamification. *Sustainability*, 8(1), 67. <https://doi.org/10.3390/su8010067>
- Buller, M. K., Kane, I. L., Dunn, A. L., Edwards, E. J., Buller, D. B., & Liu, X. (2009). Marketing Fruit and Vegetable Intake with Interactive Games on the Internet. *Social Marketing Quarterly*, 15(1), 136–154. <https://doi.org/10.1080/15245000903038316>
- Chapman, K., Goldsbury, D., Watson, W., Havill, M., Wellard, L., Hughes, C., Bauman, A., & Allman-Farinelli, M. (2017). Exploring perceptions and beliefs about the cost of fruit and vegetables and whether they are barriers to higher consumption. *Appetite*, 113, 310–319. <https://doi.org/10.1016/j.appet.2017.02.043>

- Cooper, J., & Carlsmith, K. M. (2015). Cognitive dissonance. *In Elsevier eBooks* (pp. 76–78).
<https://doi.org/10.1016/b978-0-08-097086-8.24045-2>
- Cosun Nutrition Center. (2023, February 9). *New RIVM Food Consumption Survey (2019-2021): Netherlands eating healthier*. <https://cosunnutritioncenter.com/en/news/new-rivm-food-consumption-survey-2019-2021-netherlands-eating-healthier/>
- Croes, R. (2024, May 8). *Social Media Marketing 2024: Guest Lecture 2* (Interactive Advertising) [Slide show; Video]. YouTube.
<https://www.youtube.com/watch?v=3qsun7NGqVs>
- Csikszentmihalyi, M. (2014). Applications of flow in human development and Education. *In Springer eBooks*. <https://doi.org/10.1007/978-94-017-9094-9>
- Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie Canadienne*, 49(3), 182–185. <https://doi.org/10.1037/a0012801>
- Gao, Y., & Wu, Z. (2022). Does gamification increase purchase intention? A systematic review. *Lecture Notes in Computer Science*, 327–339. https://doi.org/10.1007/978-3-031-05637-6_20
- Gezondheidsraad. (2015). *Dutch Dietary Guidelines 2015*.
- Harmon-Jones, E., Matis, S., Angus, D. J., & Harmon-Jones, C. (2024). Does effort increase or decrease reward valuation? Considerations from cognitive dissonance theory. *Psychophysiology*. <https://doi.org/10.1111/psyp.14536>
- Hassan, L. (2016). Governments should play games. *Simulation & Gaming*, 48(2), 249–267.
<https://doi.org/10.1177/1046878116683581>
- Hofacker, C. F., De Ruyter, K., Lurie, N. H., Manchanda, P., & Donaldson, J. (2016). Gamification and mobile marketing effectiveness. *Journal of Interactive Marketing*, 34, 25–36. <https://doi.org/10.1016/j.intmar.2016.03.001>

- Högberg, J., Shams, P., & Wästlund, E. (2018). Gamified in-store mobile marketing: The mixed effect of gamified point-of-purchase advertising. *Journal of Retailing and Consumer Services*, 50, 298–304. <https://doi.org/10.1016/j.jretconser.2018.07.004>
- Huotari, K., & Hamari, J. (2016). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*, 27(1), 21–31. <https://doi.org/10.1007/s12525-015-0212-z>
- Inzlicht, M., Shenhav, A., & Olivola, C. Y. (2018). The effort paradox: effort is both costly and valued. *Trends in Cognitive Sciences*, 22(4), 337–349. <https://doi.org/10.1016/j.tics.2018.01.007>
- John, D., Hussin, N., Zaini, M. K., Ametefe, D. S., Aliu, A. A., & Caliskan, A. (2023). Gamification equilibrium: the fulcrum for balanced intrinsic motivation and extrinsic rewards in learning systems. *International Journal of Serious Games*, 10(3), 83–116. <https://doi.org/10.17083/ijsg.v10i3.633>
- Johnson, D., Deterding, S., Kuhn, K., Staneva, A., Stoyanov, S., & Hides, L. (2016). Gamification for health and wellbeing: A systematic review of the literature. *Internet Interventions*, 6, 89–106. <https://doi.org/10.1016/j.invent.2016.10.002>
- Johnson, F., Wardle, J., & Griffith, J. (2002). The Adolescent Food Habits Checklist: reliability and validity of a measure of healthy eating behaviour in adolescents. *European Journal of Clinical Nutrition*, 56(7), 644–649. <https://doi.org/10.1038/sj.ejcn.1601371>
- Khan, Y., Hameed, I., & Akram, U. (2022). What drives attitude, purchase intention and consumer buying behavior toward organic food? A self-determination theory and theory of planned behavior perspective. *British Food Journal*, 125(7), 2572–2587. <https://doi.org/10.1108/bfj-07-2022-0564>

- Kim, J., & Castelli, D. M. (2021). Effects of Gamification on Behavioral Change in Education: A Meta-Analysis. *International Journal of Environmental Research and Public Health*, 18(7), 3550. <https://doi.org/10.3390/ijerph18073550>
- Kim, C., Costello, F. J., & Lee, K. C. (2020). The unobserved heterogeneous influence of gamification and Novelty-Seeking traits on consumers' repurchase intention in the omnichannel retailing. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.01664>
- Kuijper, K. (2024, August 8). *Nationaal Preventieakkoord: wat heeft het opgeleverd? (+ cijfers)*. Zorgwijzer. <https://www.zorgwijzer.nl/zorgverzekering-2025/nationaal-preventieakkoord-wat-heeft-het-opgeleverd-cijfers>
- Kusdiyanto, K., Saputro, E. P., Sholahuddin, M., Mabruroh, M., Irawati, Z., Murwanti, S., & Setyaningrum, D. P. (2022). Identification of intention to buy healthy food. *International Journal of Business Economics & Management*, 5(1), 32–41. <https://doi.org/10.21744/ijbem.v5n1.1867>
- Le-Hoang, P. V. (2020). The relationship between aesthetics, perceived value and buying intention: a literature review and conceptual framework. *Independent Journal of Management & Production*, 11(3), 1050–1069. <https://doi.org/10.14807/ijmp.v11i3.1076>
- Machín, L., Curutchet, M. R., Gugliucci, V., Vitola, A., Otterbring, T., De Alcantara, M., & Ares, G. (2020). The habitual nature of food purchases at the supermarket: Implications for policy making. *Appetite*, 155, 104-844. <https://doi.org/10.1016/j.appet.2020.104844>
- Michaelsen, M. M., & Esch, T. (2021). Motivation and reward mechanisms in health behavior change processes. *Brain Research*, 1757, 147309. <https://doi.org/10.1016/j.brainres.2021.147309>

- Michaelsen, M. M., & Esch, T. (2023). Understanding health behavior change by motivation and reward mechanisms: a review of the literature. *Frontiers in Behavioral Neuroscience*, 17. <https://doi.org/10.3389/fnbeh.2023.1151918>
- Mo, K. (2020, June 9). *Tussendoortjes langs de Nutri-Score-meetlat*. Consumentenbond. <https://www.consumentenbond.nl/voedingstests/hoe-gezond-zijn-tussendoortjes>
- Morwitz, V. G., Steckel, J. H., & Gupta, A. (2007). When do purchase intentions predict sales? *International Journal of Forecasting*, 23(3), 347–364. <https://doi.org/10.1016/j.ijforecast.2007.05.015>
- Moss, M. (2013). *Salt sugar fat: How the Food Giants Hooked Us*. Random House.
- Munthiu, M.-C. (2009). The buying decision process and types of buying decision behaviour. *In Sibiu Alma Mater University Journals. Series a. Economic Sciences* (pp. 27–28). https://www.academia.edu/41894584/The_buying_decision_process_and_types_of_buying_decision_behaviour_Maria_Cristiana_MUNTHIU
- National Institute for Public Health and the Environment. (2016). Food consumption in the Netherlands and its determinants. *In rivm.nl* (No. 2016–0195). RIVM. <https://www.rivm.nl/bibliotheek/rapporten/2016-0195.pdf>
- Nicholson, S. (Forthcoming). A RECIPE for Meaningful Gamification. To be published in Wood, L & Reiners, T., eds. *Gamification in Education and Business*, New York: Springer. Available online at <http://scottnicholson.com/pubs/recipepreprint.pdf>
- Nour, M. M., Rouf, A. S., & Allman-Farinelli, M. (2018). Exploring young adult perspectives on the use of gamification and social media in a smartphone platform for improving vegetable intake. *Appetite*, 120, 547–556. <https://doi.org/10.1016/j.appet.2017.10.016>

- Nzesi, A., Owusu, B., Barry, J., Sandhu, M., & Geliebter, A. (2023). Impact of a randomized controlled trial of discounts on fruits, vegetables, and noncaloric beverages in NYC supermarkets on food intake and health risk factors. *PLoS ONE*, *18*(11), e0291770. <https://doi.org/10.1371/journal.pone.0291770>
- Olivola, C. Y. (2018). The interpersonal Sunk-Cost effect. *Psychological Science*, *29*(7), 1072–1083. <https://doi.org/10.1177/0956797617752641>
- Pour, M. J., Rafiei, K., Khani, M., & Sabrirazm, A. (2021). Gamification and customer experience: the mediating role of brand engagement in online grocery retailing. *Nankai Business Review International*, *12*(3), 340–357. <https://doi.org/10.1108/nbri-07-2020-0041>
- Questionmark. (2020). *Welke supermarkt maakt gezond de makkelijke keuze?* (version 1.1). https://thequestionmark.cdn.prismic.io/thequestionmark/8416a2f9-8253-42dc-bab4-1e7272595e7e_Rapport+Superlijst+Gezondheid+2020+v1.1.pdf
- Questionmark (2024), Superlijst Gezondheid 2024: “Welke supermarkt maakt van gezond eten de makkelijke keuze?”, Questionmark: Amsterdam. <https://www.thequestionmark.org/download/superlist-report-nl-health-2024-v1.0.nl.pdf>
- Rijksinstituut voor Volksgezondheid en Milieu. (2021). *Consumptie naar Eetmoment*. Wat Eet Nederland. <https://www.wateetnederland.nl/resultaten/voedingsmiddelen/eetmoment>
- Rijksoverheid. (2018). Nationaal Preventieakkoord. *Open.overheid.nl*. <https://open.overheid.nl/documenten/ronl-1f7b7558-4628-477d-8542-9508d913ab2c/pdf>
- RIVM. (2016). Food consumption in the Netherlands and its determinants. *RIVM.nl* (RIVM Report 2016-0195; pp. 2–69). <https://www.rivm.nl/bibliotheek/rapporten/2016-0195.pdf>

- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066x.55.1.68>
- Santos, P. M., Dias, J. M., & Bairrada, C. M. (2024). Gamification in marketing: insights on current and future research directions based on a bibliometric and Theories, Contexts, Characteristics and Methodologies analysis. *Heliyon*, 10(11). <https://doi.org/10.1016/j.heliyon.2024.e32047>
- Schösler, H., De Boer, J., & Boersema, J. J. (2014). Fostering more sustainable food choices: Can Self-Determination Theory help? *Food Quality and Preference*, 35, 59–69. <https://doi.org/10.1016/j.foodqual.2014.01.008>
- SGF. (2024, May 6). *Gezonde generatie - samenwerkende GezondheidsFondsen*. Samenwerkende GezondheidsFondsen. <https://www.gezondheidsfondsen.nl/themas/gezonde-generatie/>
- Touchscreen Marketing. (2019). *Touchscreen Marketing*. <https://www.touchscreen-marketing.com/>
- Voedingscentrum. (n.d.). *Wat zijn gezonde tussendoortjes en snacks?* <https://www.voedingscentrum.nl/nl/service/vraag-en-antwoord/gezonde-voeding-en-voedingsstoffen/wat-zijn-gezonde-tussendoortjes-.aspx>
- Voois, I. (2022, December 14). Supermarkten kunnen meer doen om gezond eten te promoten. *AD*. <https://www.ad.nl/koken-en-eten/supermarkten-kunnen-meer-doen-om-gezond-eten-te-promoten-maar-deze-twee-zijn-al-goed-bezig~a1b8ead6/>
- Waterlander, W. E., Steenhuis, I. H., De Boer, M. R., Schuit, A. J., & Seidell, J. C. (2012). The effects of a 25% discount on fruits and vegetables: results of a randomized trial in a three-dimensional web-based supermarket. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 11. <https://doi.org/10.1186/1479-5868-9-11>

- Wen, D. M., Chang, D. J., Lin, Y., Liang, C., & Yang, S. (2014). Gamification design for increasing customer purchase intention in a mobile marketing campaign app. *In Lecture notes in computer science* (pp. 440–448). https://doi.org/10.1007/978-3-319-07293-7_43
- Wood, W., & Neal, D. T. (2009). The habitual consumer. *Journal of Consumer Psychology*, 19(4), 579–592. <https://doi.org/10.1016/j.jcps.2009.08.003>
- Yang, H., & Li, D. (2021). Understanding the dark side of gamification health management: A stress perspective. *Information Processing & Management*, 58(5), 102649. <https://doi.org/10.1016/j.ipm.2021.102649>
- Yoshida-Montezuma, Y., Ahmed, M., & Ezezika, O. (2020). Does gamification improve fruit and vegetable intake in adolescents? A systematic review. *Nutrition and Health*, 26(4), 347–366. <https://doi.org/10.1177/0260106020936143>
- Yu, N., & Huang, Y. (2021). Why do people play games on mobile commerce platforms? An empirical study on the influence of gamification on purchase intention. *Computers in Human Behavior*, 126, 106991. <https://doi.org/10.1016/j.chb.2021.106991>
- Zandi, A., & Sekhavat, Y. A. (2024). Gamification in Retail: Enhancing Grocery Customer Experience with Location-Based Strategies. *International Journal of Serious Games*, 11(2), 43–63. <https://doi.org/10.17083/ijsg.v11i2.721>

Appendices

Appendix A: Snack list from survey, no discount condition



Jumbo Elstar Appels 4 stuks
Prijs: € 2,19



**Twix Melk Chocolade karamel
Repen 5-pack**
Prijs: € 3,22



Jumbo Snack Worteltjes 300g
Prijs: € 1,45



**Jumbo Ontbijtkoek Naturel 6
Stuks**
Prijs: € 1,46



**Sultana Crunchers Kaas/Ui
4x3 stuks**
Prijs: € 1,95



**Jumbo Snackgroente
Komkommer 230g**
Prijs: € 2,29



**Jumbo Mueslireep Naturel 5
Stuks**
Prijs: € 0,93



Jumbo Druiven Wit Pitloos 500g
Prijs: € 2,49



Dole Bananen 5 Stuks
Prijs: € 1,89



**Jumbo Rijstwafels met
Yoghurtsmaak Coating 9 Stuks**
Prijs: € 1,73

Appendix B: Snack list from survey, 15% discount condition



Jumbo Elstar Appels 4 stuks

Prijs: ~~€ 2,10~~
€1,86

Profiteer nu van 15% korting!



**Twix Melk Chocolate karamel
Repen 5-pack**

Prijs: € 3,22



Jumbo Snack Worteltjes 300g

Prijs: ~~€ 1,45~~
€1,23

Profiteer nu van 15% korting!



**Jumbo Ontbijtkoek Naturel 6
Stuks**

Prijs: € 1,46



**Sultana Crunchers Kaas/Ui
4x3 stuks**

Prijs: € 1,95



**Jumbo Snackgroente
Komkommer 230g**

Prijs: ~~€ 2,20~~
€1,95

Profiteer nu van 15% korting!



**Jumbo Mueslireep Naturel 5
Stuks**

Prijs: € 0,93



Jumbo Druiven Wit Pitloos 500g

Prijs: ~~€ 2,49~~
€2,12

Profiteer nu van 15% korting!



Dole Bananen 5 Stuks

Prijs: ~~€ 1,89~~
€1,61

Profiteer nu van 15% korting!



**Jumbo Rijstwafels met
Yoghurtsmaak Coating 9 Stuks**

Prijs: € 1,73

Appendix C: Link to the game

This is the link leading to the game used in the gamified discount condition, as presented during the survey: <https://gx.games/games/h968iy/snack-catch/tracks/260fe4fa-29e1-4416-aefe-d2482db686af/>. This game works best on a mobile device.

Appendix D: The Snacks Habits Checklist

Modified and translated from The Adolescent Food Habits Checklist by F. Johnson et al. (2002).

1. Meestal kies ik een verpakt en ongezond product als ik een snack wil tijdens de werk- of studiedag.
Bijna altijd – vaak – soms – zelden – nooit
2. Meestal kies ik groente of fruit als ik een snack wil tijdens de werk- of studiedag.
Bijna altijd – vaak – soms – zelden - nooit
3. Ik eet tenminste twee stuks fruit per dag.
Bijna altijd – vaak – soms – zelden – nooit
4. Ik eet tenminste 250 gram groente per dag.
Bijna altijd – vaak – soms – zelden - nooit
5. Over het algemeen lukt het mij om me aan de groente en fruit richtlijnen van het Voedingscentrum te houden (2 stuks fruit en 250 gram groente per dag).
Bijna altijd – vaak – soms – zelden – nooit
6. Over het algemeen heb ik een gezond dieet.
Bijna altijd – vaak – soms – zelden – nooit
7. Mijn voedingspatroon bevat groente en fruit.
Bijna altijd – vaak – soms – zelden – nooit
8. Ik vind dat gezond eten belangrijk is.
Sterk mee eens – mee eens – mee oneens – sterk mee oneens

Appendix E: Informed consent letter

Bedankt dat u wilt deelnemen aan mijn onderzoek. Deze vragenlijst is onderdeel van mijn master scriptie Bedrijfscommunicatie en Digitale Media aan de Universiteit van Tilburg.

Informatie en consent

U bent uitgenodigd om deel te nemen aan een onderzoek over consumptiegedrag in supermarkten. Het doel van dit onderzoek is om meer inzicht te krijgen in het consumptiegedrag van klanten in een supermarkt omgeving.

Wat gaat er gebeuren?

Dit onderzoek bestaat uit een online vragenlijst. In deze vragenlijst worden algemene vragen over uzelf gesteld en zult u een opdracht krijgen waarbij u zich voor moet stellen dat u boodschappen gaat doen. Daarna volgen nog een aantal extra vragen. De vragenlijst zal maximaal rond de 10 minuten duren.

Vrijwillige deelname

U doet vrijwillig mee aan dit onderzoek, wat betekent dat u op elk moment kunt stoppen met dit onderzoek zonder daar een reden voor te geven.

Wat gebeurt er met mijn data?

De data verzameld in dit onderzoek zal worden gebruikt door onderzoekers als dataset en in een scriptie. De geanonimiseerde data is toegankelijk voor andere onderzoekers gedurende 10 jaar. Wanneer deze data met andere onderzoekers wordt gedeeld, kan deze niet daar u worden herleid.

Alle gegevens worden veilig bewaard volgens de Universiteit van Tilburg richtlijnen. Omdat de data onmiddellijk wordt geanonimiseerd, is het achteraf niet mogelijk om uw data te verwijderen. Mocht u vragen of klachten hebben over dit onderzoek, kunt u contact opnemen met de onderzoeker: Joline Stolk (email: j.r.stolk@tilburguniversity.edu).

Als u niet mee wilt doen aan dit onderzoek, weiger dan deelname door hieronder op de “Ik wil niet deelnemen” knop te klikken.

Alvast bedankt voor uw deelname namens Joline Stolk, student aan de afdeling Geesteswetenschappen en Digitale Wetenschappen van de Universiteit Tilburg.

Om deel te nemen aan dit onderzoek, ga ik akkoord met de volgende voorwaarden:

- Ik heb de bovenstaande informatie gelezen en gaat hiermee akkoord.
- Ik geef toestemming voor de verwerking van anonieme/gecodeerde gegevens zoals vermeld in de bovenstaande informatie.
- Ik doe vrijwillig mee aan dit onderzoek.
- Ik ben 18 jaar of ouder.
- Ik begrijp de Nederlandse taal en woon in Nederland.
- Ik volg geen veganistisch-, glutenvrij-, lactosevrij-, of caloriearm dieet.
- Ik ben niet allergisch voor noten.

Appendix F: Debrief

Bedankt voor uw tijd en deelname aan dit onderzoek! Dit onderzoek had drie verschillende vormen, een vorm waarin je korting kon winnen in een spel, een vorm waarin er een standaard korting was en een vorm zonder korting. Het doel van dit onderzoek was om uit te zoeken of men meer groente en fruit koopt als ze hierop korting hebben gewonnen, dan als ze korting krijgen of als er helemaal geen korting is.