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EMOTIONAL DETERMINANTS OF SNACK CONSUMPTION BY POLISH CONSUMERS

EMOCJONALNE UWARUNKOWANIA KONSUMPCJI PRZEKĄSEK PRZEZ POLSKICH KONSUMENTÓW

Ewa Jerzyk[*1], Mirosława Kaczmarek[2], Dobrosława Mruk-Tomczak[3], Natalia Gluza[4]

[1,4] Poznań University of Economics and Business, Department of Marketing Strategies, Al. Niepodległości 10, 61-875 Poznań, Poland

[2] Poznań University of Economics and Business, Department of Market Research and Services, Al. Niepodległości 10, 61-875 Poznań, Poland

[3] Poznań University of Economics and Business, Department of Product Marketing, Al. Niepodległości 10, 61-875 Poznań, Poland

[1*]E-mail: ewa.jerzyk@ue.poznan.pl
ORCID: 0000-0001-8474-3570
[2]E-mail: miroslawa.kaczmarek@ue.poznan.pl
ORCID: 0000-0002-3844-6310
[3]E-mail: dobroslawa.mruk-tomczak@ue.poznan.pl
ORCID: 0000-0002-4548-8260
[4]E-mail: natalia.gluza@ue.poznan.pl
ORCID: 0000-0002-9864-4116

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ABSTRACT

Emotions are the effect but also the cause of eating behaviors, including the purchase and consumption of snacks. As snacks become an increasingly prevalent segment of the food industry, their consumption has been linked to rising rates of overweight, obesity, and diet-related diseases. Understanding how emotional valence influences consumer attitudes and behaviors toward snacks is therefore crucial. This study explores the relationship between emotional eating and the propensity to consume unhealthy snacks, both sweet and salty. A survey of 707 representative participants revealed distinct emotional patterns in snack consumption, with choices significantly influenced by consumers' emotional states and personal preferences. Furthermore, individuals who frequently opted for unhealthy snacks typically exhibited poorer health and financial profiles.

Key words: emotions; emotional eating; consumers' behaviour; snacks

ABSTRAKT

Emocje są skutkiem, ale również przyczyną zachowań żywieniowych, w tym kupowania i spożywania przekąsek. Przekąski to dynamicznie rozwijający się segment produktów żywnościowych, których konsumpcja wydatnie przyczynia się do zwiększenia wzrostu nadwagi i otyłości społeczeństwa oraz ryzyka wystąpienia chorób dietozależnych. Istnieje potrzeba zrozumienia jak walencja emocji kształtuje postawy i zachowania nabywców wobec przekąsek oraz ich smaku. Celem przeprowadzonego badania było rozpoznanie relacji między jedzeniem emocjonalnym a skłonnością do sięgania po niezdrowe przekąski (słodkie i słone). Przeprowadzone badanie ankietowe na reprezentatywnej grupie 707 respondentów wykazały emocjonalne wzorce konsumpcji przekąsek. Konsumenci spożywają przekąski zależnie od odczuwanego stanu emocjonalnego oraz ich smaku. Ponadto osoby chętnie sięgające po niezdrowe przekąski cechują się negatywnym profilem cech opisujących ich stan zdrowia i sytuację finansową.

Słowa kluczowe: emocje; jedzenie emocjonalne; zachowania nabywców; przekąski

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Introduction

Emotion is a response to the cognitive appraisal of stimuli from the environment and is an integral part of human behavior (Frayn et al., 2018). Consumers often engage emotions in decision-making processes (Thaler & Sunstein, 2008; Zaltman, 2003; Damasio, 1994), including food choices where emotions frequently guide behavior (Godet et al., 2022). Research has confirmed the link between emotional states and food choice and consumption (Ljubičić et al., 2023). Most studies in this area focus on the relationship between negative emotions and eating behaviors (Fuente Gonzales et al., 2022). However, some researchers point to a connection between positive emotions and food consumption (Devonport et al., 2019; Reichenberger et al., 2020; Ljubičić et al., 2023). Therefore, the term "emotional eating" is often used to describe increased food consumption as a reaction to emerging emotions, both positive and negative. Emotional eating affects both overweight and obese individuals, as well as those maintaining a normal weight. It has been found that the latter consume less

food in response to emotions than overweight or obese individuals (Frayn et al., 2018). Emotional eating has also been proven to be positively associated with waist circumference, abdominal obesity, body mass index (BMI), and obesity according to the percentage of body fat (Betancourt-Núñez et al., 2022). It is important to emphasize that overweight and obesity have many secondary health consequences, such as cardiovascular diseases, diabetes, and an increased risk of certain cancers (Obesity and Overweight, n.d.). They also constitute a significant economic burden on society (Scarborough et al., 2011; Shimul et al., 2021).

Regarding negative emotions, their appearance triggers a range of physiological reactions that can either promote a lack of appetite or reduce food intake, or increase food consumption (Betancourt-Núñez et al., 2022). High stimulation arousal in response to negative emotions (e.g., fear, anger) may reduce consumption, while negative emotions felt at a moderate level may increase it (Reichenberger et al., 2020). This has been especially verified about stress. Although stress is most commonly viewed as a negative stimulus, it can occasionally be interpreted as a positive response that stimulates and encourages activity (Ljubičić et al., 2023). In situations of strong, sudden stress, norepinephrine inhibits appetite, while in chronic stress, cortisol stimulates it (Ljubičić et al., 2023). Empirical evidence has shown that eating habits are modified under the influence of stress (Borsellino et al., 2020).

Studies on emotional eating behaviors suggest that negative mood, sadness, tension, and emotional instability precede an increase in food consumption (Devonport et al., 2019). However, stress, boredom, and depression were the emotions most often identified as those affecting higher food intake (Fuente Gonzales et al., 2022). It has been reported that food consumption distracts a person from experiencing negative emotions (Betancourt-Núñez et al., 2022), and is also a way to fill the void that can arise in situations of sadness, depression, social isolation, or other stressful life events (Ljubičić et al., 2023). Negative emotions strongly associated with eating behaviors include anxiety, sadness, loneliness, worry, boredom, anger, stress, and depression (Fuente Gonzales et al., 2022). Depression is linked with stress, negative mood, loneliness, and social isolation, all of which contribute to emotional eating (Ljubičić et al., 2023). Additionally, tendencies to experience boredom, aggression, and anger are positively associated with emotional eating (Devonport et al., 2019).

Research indicates that positive emotions play a significant role in enhancing food intake (Reichenberger et al., 2020; Fuente Gonzales et al., 2022). It has been observed that positive moods are closely linked to socialization and food consumption. Specifically, individuals tend to experience greater enjoyment and prolong their mealtime when dining with familiar and amicable companions, leading to increased food consumption. Furthermore, past studies suggest that people often opt for healthier food choices when experiencing positive emotions (Li et al., 2021).

As indicated, both positive and negative emotions influence an increase in food consumption, yet negative emotions are one of the most important causes of excessive consumption and emotional eating (Reichenberger et al., 2020).

Studies have shown that emotions affect not only the increase in consumption, but also the type of food that consumers reach for under their influence (Devonport et al., 2019). Individuals who engage in emotional eating tend to snack more frequently (Rachmawati et al., 2019). Snacking is eating food, often without hunger, between main meals. Emotional eating is positively associated with higher consumption of tasty, high-energy, sweet, and high-fat snacks (Rachmawati et al., 2019). This pattern is observed in both men and women across different life stages (Fuente Gonzales et al., 2022), particularly regarding increased consumption of fast food, salty snacks, sweet high-fat foods, or high-energy foods such as cakes, biscuits, cookies, ice cream, chocolate and its derivatives, candies, and artificially sweetened beverages (Betancourt-Núñez et al., 2022). Stress and negative emotions often lead to the consumption of high-energy, nutrient-poor foods (Devonport et al., 2019). It has been proven that consuming tasty dishes (usually rich in sugar or fat) provides immediate pleasure and reward (positive affective responses), which can lessen the impact of negative emotions (Betancourt-Núñez et al., 2022). As studies show overweight or obese individuals prefer sweet-tasting snacks (e.g., cakes, cookies, biscuits) or sweet and milky drinks, while underweight individuals tend to choose cooked snacks, fruits, and dairy products (Rachmawati et al., 2019).

When it comes to how our emotions affect what we eat, it is interesting to note that posi-tive emotions can lead to both healthy and unhealthy eating habits. For instance, research by Moss et al. (2021) found that positive emotions tend to kickstart the consumption of nutritious foods like fruits. On the flip side, another study (Evers et al., 2013) revealed that positive

emotions can also prompt indulgence in unhealthy snacks. Age plays a role too. Among chil-dren, positive emotions seem to correlate with more unhealthy snack consumption, while among young adults, negative emotions are more closely linked to such behavior (Moss et al., 2021). Parents also influence what children eat, especially in terms of sweet snacks. For instance, they might reward good behavior or achievements with sugary treats. Furthermore, snacks can serve as a way to manage behavior and emotions during interactions between chil-dren and their parents (Jansen et al., 2021).

Changes in food consumption behaviors due to fluctuations in emotional states may be induced by situations or events that go beyond an individual's daily routine. The COVID-19 pandemic, for instance, may have altered consumers' emotional states and thereby changed consumer behaviors (Borsellino et al., 2020). In the literature, food choices are recognized as dynamic and evolving throughout life; they are also considered quite stable and largely driven by habits, especially over shorter periods. Significant changes or turning points in food choice patterns are usually initiated by important life events. Research suggests that the COVID-19 pandemic and related restrictions affecting daily life have caused, at least temporarily, changes in the patterns of food purchasing and consumption for a large share of consumers (Jansen et al., 2021).

Some research findings (Ben Hassen et al., 2020; Ben Hassen et al., 2021) have indicated that some individuals reduced their consumption of unhealthy food (e.g., sweets, desserts, cookies, and biscuits) during the pandemic, adopting healthier eating habits, particularly seeking to strengthen their immune system. However, this trend varied across countries. For instance, in Italy, Denmark, Norway, and the United States, there was an increase in the consumption of highly processed, high-fat, or high-sugar foods (including chocolate, chips, and snacks). This was more common among women, who tended to eat more food, explained by the fact that women were more depressed, stressed, and restless, leading to emotional eating (Li et al., 2021). Emotions, as a predictor of the mental health of society, also account for changes in eating habits during the pandemic. Studies on the scale of negative emotions among the general population during the COVID-19 pandemic have reported the prevalence of stress at 29.6%, anxiety 31.9%, and depression 33.7% (Salari et al., 2020). Social isolation, uncertainty, and the potential adverse effects of illness significantly altered eating

behaviors, increasing the scale of dysfunctional eating habits (such as binge eating, emotional eating, impulsive or compulsive eating) as well as the purchase of comfort foods (unhealthy junk foods).

Considering the role of emotions in changing the level of food consumption, including the propensity to reach for snacks, we resolved to analyze this issue in more detail. The aim of this article is to verify how different emotional states determine food consumption, including the desire to reach for snacks. The following research hypotheses were formulated:

H1: Individuals who increase their food consumption in response to negative emotions (NE) rate their financial situation worse than other sample segments (PE, WE, BE).

H2: Individuals who increase their food consumption in response to negative emotions (NE) have a negative health profile characterized by:

a. a poorer assessment of general health,
b. greater weight gain,
c. BMI above the norm,
d. less physical activity.

H3: The tendency to reach for snacks differs between sample segments depending on the emotional state experienced and the flavor of the snack:

a. During positive emotions, PE consumers are more likely to reach for salty snacks (chips, snacks, crackers, pretzels) than other segments (NE, WE, BE).
b. During positive emotions, PE consumers are more likely to reach for sweet snacks (cookies, chocolates, candies, ice cream, candy bars) than other segments (NE, WE, BE).
c. During negative emotions, NE consumers are more likely to reach for salty snacks (chips, snacks, crackers, pretzels) than other segments (PE, WE, BE).
d. During negative emotions, NE consumers are more likely to reach for sweet snacks (cookies, chocolates, candies, ice cream, candy bars) than other segments (PE, WE, BE).

Methodology

To achieve the set objectives, a nationwide study was conducted using the Computer-Assisted Web Interviewing (CAWI) method on a representative sample of 707 respondents who had purchased food. The samples were

representative for Polish adults citizens according to gender, age, and place of residence. The research was conducted by a specialised research agency certified by ESOMAR (European Society for Opinion and Market Research). The structure of the research sample, based on selected socio-demographic characteristics as well as physical condition and health status, is presented in Table 1. The study was positively reviewed by the Research Ethics Committee for research involving human participants at the Poznań University of Economics and Business.

Table 1. Structure of the research sample

	Number	**(%)**
Total	707	(100.0)
Gender		
Female	373	52.76
Male	334	47.24
Age		
18–29	128	18.10
30–39	134	18.95
40–49	127	17.96
50–59	101	14.29
60+	217	30.96
Education		
Primary	43	6.08
Basic vocational	1023	14.43
Secondary	304	43.00
Higher	258	36.49
Place of residence		
Village	268	37.91
A town with up to 10,000 inhabitants	45	6.36
City from 10,000 to 20,000 inhabitants	46	6.51
City from 20,000 to 50,000 inhabitants	82	11.60
City from 50,000 to 100,000 inhabitants	60	8.49
City from 100,000 to 200,000 inhabitants	61	8.63
City over 200,000 inhabitants	145	20.51
Assessment of financial situation		
Very bad	13	1.84
Bad	55	7.78

Average	358	50.64
Good	254	35.93
Very good	27	8.82
Assessment of overall health status		
Bad	9	1.27
Rather bad	75	10.61
Neither good nor bad	217	30.69
Rather good	350	49.50
Good	56	7.92
Assessment of physical activity		
No activity	125	17.68
Very weak	192	27.16
Moderate	273	38.61
High	93	13.15
Very high	24	3.39
Change in weight		
Decreased	110	15.56
Remained unchanged	390	55.16
Increased	207	29.28
BMI		
Below normal	23	3.25
Normal	320	45.26
Above normal	364	51.49

In constructing research tools, a method commonly used in consumer behavior sciences, the masked method (deception), was employed. This means that the actual purpose of the research was concealed from its participants (Brzeziński, 2004). Participants were asked to fill out a questionnaire consisting of fourteen questions in the main part and ten questions in the expanded metric part. The results presented in the article come from this study and are part of a larger research project concerning the emotional determinants of food consumption. The specific objectives of the study were as follows:

1. to analyze the consumer profile based on socio-demographic characteristics in the context of changes in consumption under the influence of emotions,

2. to identify factors differentiating the tendency to reach for snacks when experiencing emotions (positive and negative).

To verify the research hypotheses, two types of snacks were distinguished: salty (chips, snacks, crackers, pretzels) and sweet (cookies, chocolates, candies, ice cream, candy bars).

A statistical cluster analysis (k-means) was performed to check if there were segments among the respondents showing increased food consumption depending on the emotions experienced (including the valence of emotions - negative/positive emotions). This data exploration method divided respondents into homogeneous groups based on their answers so that each group contained individuals whose responses were similar. The cluster analysis was based on responses to questions about the impact of the emotional states experienced by the respondent on the amount of food consumed. The EMAQ scale (Emotional Appetite Questionnaire) was used to determine the emotional attitude toward food consumption, which has been validated and then developed in many studies (Bilici et al., 2020; Bourdier et al., 2017; Geliebter & Aversa, 2003; Nolan et al., 2010). Positive emotional states such as being happy, relaxed, cheerful, enthusiastic, and self-satisfied were distinguished, as well as negative states like being sad, bored, bad, restless, frustrated, tired, depressed, and scared.

Basic descriptive statistics (mean, standard deviation) were calculated to compare the results for each group, considering the criterion of increased food consumption during positive/negative emotional experiences.

Appropriate statistical tests were conducted for the verification of the research hypotheses: one-way ANOVA for data with a normal distribution, and the non-parametric Kruskal-Wallis test for data without a normal distribution. Post-hoc tests were conducted where appropriate. The significance level was set at p=0.05. SPSS Statistics software was used to perform the analyses.

Results

Emotional determinats of increased consumption

Cluster analysis showed that the increase in food consumption by respondents differs depending on the emotional states they experience. K-means analysis allowed respondents to be classified into 4 segments (Table 2). The first of these are people who eat more depending on emotions, but

irrespective of their valence (WE). In other words, experiencing both positive and negative emotions determines their increased consumption. The second and third segments were made up of people for whom increased consumption is already dependent on the valence of emotions: people who eat more in states of emotional tension (NE), which means that they declared increased food consumption under the influence of negative emotions, such as being sad or frustrated, and people who eat more during positive emotional experiences (PE), which means that they showed increased consumption under the influence of positive emotional states (e.g., being happy and/or relaxed). The last segment was made up of people who do not show increased consumption while experiencing emotions (BE).

Table 2. Emocional determinants of increased consumption are divided into segments: WE, NE, PE, BE.

			Segment $\bar{x}$ (σ)			
			WE	NE	PE	BE
Emotional states	Negative	Sad	6.89 (1.528)	5.46 (1.247)	2.45 (1.463)	3.34 (1.320)
		Bored	6.72 (1.477)	5.32 (1.274)	3.51 (2.150)	4.32 (1.537)
		Angry	6.80 (1.778)	5.23 (1.196)	2.46 (1.388)	3.29 (1.454)
		Anxious	6.80 (1.824)	5.16 (1.273)	2.66 (1.478)	3.31 (1.350)
		Frustrated	6.81 (1.577)	5.35 (1.271)	2.62 (1.466)	3.23 (1.281)
		Tired	6.35 (1.863)	4.65 (1277)	3.44 (1.964)	3.26 (1.588)
		Depressed	7.05 (1.640)	5.34 (1.366)	2.53 (1.493)	3.27 (1.340)
		Scared	6.35 (1.919)	4.68 (1.358)	2.16 (1.393)	2.66 (1.279)
		Lonely	6.95 (1.595)	5.45 (1.246)	3.23 (2.101)	3.95 (1.678)
	Positive	Self-satisfied	6.49 (1.411)	5.03 (1.044)	7.12 (1.398)	5.10 (1.159)
		Happy	6.81 (1.460)	4.99 (1.098)	7.76 (0.982)	4.94 (1.251)
		Relaxed	6.51 (1.436)	5.01 (1.078)	7.32 (1.320)	5.08 (1.132)
		Cheerful	6.79 (1372)	5.01 (1.052)	7.34 (1.298)	4.92 (1.276)
		Enthusiastic	7.02 (1.263)	4.91 (1.045)	6.71 (1.606)	4.75 (1.240)
n (%)			85 (12.02%)	375 (53.04%)	93 (13.15%)	154 (21.78%)

For the vast majority of respondents (78%), feeling certain emotions contributes to an increase in food consumption. Almost half of the respondents (53%) reported increased consumption when in a state of emotional tension, especially when feeling sad ($\bar{x}$=5.46), lonely ($\bar{x}$=5.45), or frustrated ($\bar{x}$=5.35). The NE segment is mostly composed of people with secondary education (43.5%) living in urban areas (63.2%, mainly in cities with a population of 20,000–50,000). These respondents also indicated that they have large households, with 60.3% having at least three members (26.7% – three members, 20.0% – four, 8.5% – five, and 5.1% – six+). Women more frequently reported increased consumption in response to negative emotions than men (54.4% women, 45.6% men).

Consumers who increase their food intake due to positive emotions represent 13% of the study participants. They report the highest increase when feeling happy (average $\bar{x}$=7.76), cheerful ($\bar{x}$=7.34), and relaxed ($\bar{x}$=7.32). These consumers are primarily city residents with secondary education and are urban residents (64.5%, including cities of 20,000–50,000 and over 200,000 inhabitants). Almost 70% reported that their household consists of at least three members (21.5% – three members, 25.8% – four members, 12.9% – five members, and 9.7% – six+). Men are more likely than women to report increased consumption due to positive emotions (men: 54.8%, women: 45.2%).

For about one in every eight respondents (12%), the valence of emotions does not affect their food consumption; that is, they report increased consumption regardless of whether the emotions are positive or negative. The emotions associated with the highest increase in consumption include feeling depressed (negative emotion; mean $\bar{x}$ =7.05), enthusiastic (positive emotion; $\bar{x}$ =7.02), and lonely (negative emotion; $\bar{x}$ =6.95). The WE segment mainly consists of individuals with secondary education (44.7%), living in both villages and cities (45.9% and 54.1%, respectively). A significant majority of these respondents have large households: 35.3% have three-person households, 24.7% four-person, 11.8% five-person, and 7.1% have households of six or more. The increase in consumption, independent of emotional valence, is reported equally by women (49.4%) and men (50.6%).

One in five participants (22%) reported that experiencing emotions, whether negative or positive, does not lead to increased food consumption. This segment is largely composed of individuals with secondary education (40.9%), residing in cities, predominantly those with populations between

20,000 to 50,000. Women (55.2%) more frequently reported that their consumption does not increase due to emotional states, as compared to men (44.8%).

Characteristics defining the health status and economic situation of the consumer as factors differentiating sample segments

To verify hypotheses H1 and H2, a one-way ANOVA analysis was conducted. The analysis showed that factors such as consumers' subjective perception of their financial situation (H1; F=3.480; p=0.016), subjective assessment of overall health (H2a; F=3.356; p=0.019), and weight change during the pandemic (since March 2020) (H2b; F=7.086; p<0.001) differentiate respondents' susceptibility to emotional influence on increased food consumption (Table 3, Figure 1).

Table 3. Consumer characteristics divided into segments: WE, NE, PE, BE

		Segment $\bar{x}$ (σ)				Statistical verification
		WE	NE	PE	BE	
Financial situation	Assessment of financial situation	2.38 (0.886)	2.24 (0.720)	2.44 (0.729)	2.42 (0.730)	F=3.480; p=0.016
Health status	Assessment of overall health status	2.42 (0.931)	2.46 (0.813)	2.63 (0.805)	2.67 (0.833)	F=3.356; p=0.019
	Change in weight	2.39 (0.638)	2.15 (0.655)	1.97 (0.683)	2.06 (0.612)	F=7.086; p<0.001
	BMI	2.58 (0.564)	2.49 (0.556)	2.38 (0.569)	2.474 (0.574)	F=1.914; p=0.126
	Assessment of physical activity	2.68 (1.093)	2.55 (1.017)	2.61 (1.022)	2.56 (1.048)	F=0.454; p=0.714

The segment of individuals who increase consumption under the influence of negative emotions (NE) evaluated their financial situation as poor (mean $\bar{x}$=2.24) and overall health state as low ($\bar{x}$=2.46), with a frequent declaration of weight gain during the pandemic ($\bar{x}$=2.15). Conversely, the

segment influenced by positive emotions (PE) rated their financial situation ($\bar{x}$=2.44) and health ($\bar{x}$=2.63) higher, reporting weight loss or stability during the pandemic ($\bar{x}$=1.97). Those influenced by emotions regardless of valence (WE) rated their financial and health situation slightly worse, with the highest weight gain reported during the pandemic ($\bar{x}$=2.39). Consumers not influenced by emotions (BE) had a more positive view of their financial status ($\bar{x}$=2.42) and the best health state ($\bar{x}$=2.67), with no significant weight changes in the pandemic ($\bar{x}$=2.06). One-way ANOVA indicated that other factors like BMI index or physical activity did not differentiate the segments significantly (respectively: H2c: F=1.914; p=0.126 and H2d: F=0.454; p=0.714).

Positive emotions and the desire to eat snacks (salty/sweet)

The study further examined whether belonging to a particular segment of the sample, meaning the relationship between experiencing emotions and their valence, correlates with an increase in overall food consumption and a propensity to eat snacks. This relationship was investigated regarding the emotional state felt (positive for H3ab, negative for H3cd) and the taste of the snacks (salty for H3ac, sweet for H3bd).

Table 4. Positive emotions and the desire to eat snacks (salty/sweet)

		Segment $\bar{x}$ (σ)				Statistical verification
		WE	NE	PE	BE	
Positive emotion	Salty snacks (chips, snacks, crackers, and pretzels)	2.40 (0.819)	2.13 (0.737)	2.58 (0.889)	2.15 (0.703)	H=24.067; p<0.001
	Sweet snacks (cookies, chocolates, sweets, ice cream, candy bars)	2.65 (0.812)	2.41 (0.728)	2.77 (0.782)	2.37 (0.732)	H=19.659; p<0.001

For those experiencing positive emotions, a notable difference was seen in the consumption of salty snacks among the segments. The PE segment reported often consuming salty snacks (mean $\bar{x}$=2.58) when feeling positive emotions. They tend to eat salty snacks such as chips, snacks, crackers, and pretzels more than other segments. The WE group also frequently consumes

salty snacks when experiencing positive emotions, though less so than the PE group (mean $\bar{x}$=2.40). The BE and NE segments showed the least tendency to consume salty snacks when in a positive emotional state, with $\bar{x}$=2.15 and $\bar{x}$=2.13 respectively. The one-way ANOVA analysis revealed a statistically significant impact of emotional conditions on the overall consumption of the tendency to eat salty snacks when experiencing positive emotions (H=24.067; p<0.001), thereby confirming hypothesis H3a.

Similarly, the results shape the propensity for consuming sweet snacks while experiencing positive emotions. While feeling positive emotions, the PE segment declares a high desire to consume cookies, chocolates, candies, ice cream, or candy bars $\bar{x}$=2.77. Their inclination towards eating sweet snacks is higher than other segments. While experiencing positive emotions, individuals belonging to the WE groups also frequently reach for sweet snacks (though less often than PE, $\bar{x}$=2.65). Conversely, the NE and BE segments less frequently show a desire to consume cookies, chocolates, candies, ice cream, or candy bars, respectively: $\bar{x}$=2.41 and $\bar{x}$=2.37. To verify hypothesis H3b, a one-way ANOVA analysis was performed, which showed a statistically significant influence of emotional factors on reaching for sweet snacks while experiencing positive emotions (H=19.659; p<0.001). Hypothesis H3b was therefore confirmed.

Negative emotions and desire for snacks (salty/sweet)

Next, we examined whether the negative emotional state differentiates the propensity to reach for snacks (salty/sweet) among the specified sample segments (WE, NE, PE, BE).

Consumers in the PE and WE segments declare a high inclination to reach for salty snacks while experiencing negative emotions (respectively: $\bar{x}$=2.47 and $\bar{x}$=2.45) (Table 5). They admit to frequently consuming chips, snacks, crackers, and pretzels when in an emotionally tension state. The NE group showed a significantly lower inclination to consume these snacks. This segment declared rarely reaching for salty snacks ($\bar{x}$=2.21). Experiencing negative emotions also affects the consumption of chips, snacks, crackers, and pretzels by BE individuals. They exhibited the lowest inclination to reach for salty snacks ($\bar{x}$=2.14). To verify hypothesis H3c, a one-way ANOVA analysis was conducted, which showed a statistically significant influence of emotional conditions on reaching for salty snacks in an emotional tense state (F=3.743; p=0.11). Despite the statistically significant relationship

between variables, hypothesis H3c was refuted, because it was the PE segment (rather than the NE segment) that exhibited the greatest desire for snack consumption.

Table 5. Negative emotions and the desire to eat snacks (salty/sweet)

		Segment $\bar{x}$ (σ)				Statistical verification
		WE	NE	PE	BE	
Negative emotion	Salty snacks (chips, snacks, crackers, and pretzels)	2.45 (0.852)	2.21 (0.741)	2.47 (0.892)	2.14 (0.667)	H=11.451; p<0.003
	Sweet snacks (cookies, chocolates, sweets, ice cream, candy bars)	2.66 (0.894)	2.53 (0.755)	2.63 (0.844)	2.36 (0.684)	F=3.743; p<0.11

In a state of emotional tension, consumers show a high inclination to reach for sweet snacks. The WE, PE, and NE groups often reach for cookies, chocolates, candies, ice cream, and candy bars, showing respective values of: $\bar{x}$=2.66; $\bar{x}$=2.63, and $\bar{x}$=2.53. Consumers who did not declare an increase in consumption under the influence of emotions (BE) indicated that experiencing negative emotions rarely affects their consumption of sweet snacks ($\bar{x}$=2.36). To check for differences between segments and the consumption of sweet snacks while experiencing negative emotions, a Kruskal-Wallis test was carried out, which did not show a statistically significant influence of emotional conditions on reaching for sweet snacks (F=3.743; p=0.11). Hypothesis H3d was therefore refuted.

Discussion

Unhealthy snacks, rich in energy, sugar, and salt, have a negative impact on consumers' health, and their excessive consumption significantly contributes to the rise in overweight and obesity in society (Almoraie Karlsson et al., 2021). It seems that promoting healthy snacks with high nutritional content through education is important for improving health and reducing the risk of diseases, but it may be ineffective due to the emotional

motivations for their consumption. The results of our study confirmed not only the emotional patterns of food consumption but also the emotional nature of snack consumption. Both positive and negative emotions shape food consumption, but negative ones have a greater impact, consistent with the findings of Saine and Zhao (2021). Cluster analysis revealed four patterns of emotional eating, three of which (WE, NE, and PE), covering over 78% of the respondents, indicate the influence of emotions (Figure 1). The most negative emotions influencing food consumption in all three segments were loneliness (ranking 2nd in WE and NE, and 3rd in PE) and sadness (ranking 3rd and 1st, respectively, in WE and NE). These emotions were often highlighted as negative consequences of the pandemic, leading to increased consumption of unhealthy snacks. This suggests that the negative impact of the pandemic may have been one of the factors increasing appetite and food consumption. Individuals experiencing negative emotions such as anxiety, depression, and pandemic-related stress were more likely to reach for snacks as a way of coping with these emotions. Thus consumption could serve as an emotional function and as a coping mechanism during challenging situations / facing difficulties.

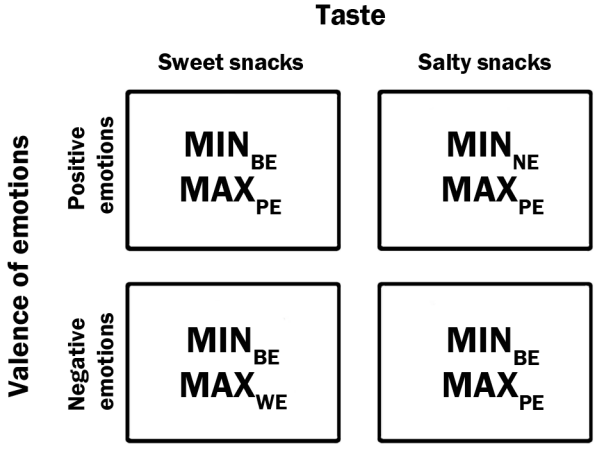

Figure 1. Snack consumption and taste and valence of emotions

Experiencing emotions leads to a greater craving for sweet snacks than for salty ones. The sweet taste of snacks is perceived as a way to soothe negative feelings and a source of pleasure. Wołosiak et al. (2016) suggest that

consuming sugars and other sweet substances additionally provides pleasure due to the production of endorphins, often referred to as happiness hormones. Sweetness can act as a motivating factor for consumption, hence it is reasonable to assume that this attribute will play a crucial role in consumer communications. Associating a product with sweetness may translate into its being preferred and selected. Decoupling the sweet taste from snacks opens up new avenues for promoting more beneficial snacking options.

Linking specific categories of snacks to emotions being experienced may have serious consequences in terms of reinforcing unhealthy dietary behaviors. Emotions are treated as triggers for certain behaviors, which over time become habits. Snack consumption may be tied to habits acquired in childhood and youth, then perpetuated in adulthood and maturity, and passed on to subsequent generations. Using sweet snacks as a reward for good behavior or consolation for a sad child create a conditioned response, in which the young consumer learns such behavior and acquires a routine. Therefore, it is crucial to promote healthy dietary patterns among parents and children in emotional contexts, based on healthy snacks and shifting the narrative around food discourse (so that food serves neither as a reward, nor as a punishment).

Research has shown a strong link between emotions and snack consumption, revealing certain characteristic patterns associated with consumer profiles. We found that financial situation, health status, and weight change are associated with membership in distinct clusters (Figure 2). In our study, dissatisfaction with one's financial situation, health status, and weight gain were predictors of belonging to the WE and NE groups, while a positive profile of these features translated into membership in the PE group.

The assessment of one's financial situation may influence behaviors in response to stressful life situations. Individuals who rate their financial situation worse may be more prone to negative emotions related to financial problems. Food consumption could serve as a form of emotional compensation or coping mechanism for life difficulties. Additionally, lower socioeconomic status could limit access to other stress coping mechanisms, increasing the attractiveness of eating as a way to alleviate negative feelings.

Individuals who rated their financial situation worse may also be more prone to be overweight and face health problems associated with excessive

food consumption. This can lead to more serious health problems such as obesity, diabetes, and heart disease. There is a need for targeted interventions to support individuals with low financial self-esteem in managing emotions and coping with stress in a healthier way than through excessive food consumption. Individuals with poorer financial self-esteem may also be more susceptible to compulsive food consumption as a way to cope with negative emotions.

Subjective assessment of one's health status and weight gain significantly influences dietary behaviors in situations of negative emotions. Individuals who felt that their health had deteriorated during the pandemic more often reached for snacks as a way to cope with stress and anxiety related to illness. This suggests that worsening health may be a risk factor for increased consumption of unhealthy food during periods of emotional stress.

Moreover, individuals who experienced weight gain during the pandemic tended to reach for snacks as a form of emotional compensation. This behavior may be related to lower self-esteem and greater psychological burden associated with weight gain. Weight gain may be a risk factor for increased snack consumption as a coping mechanism for stress.

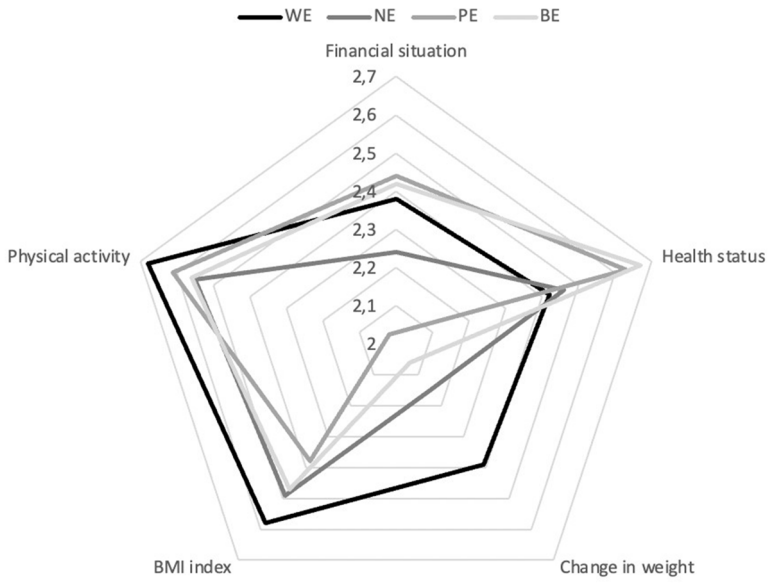

Figure 2. Cluster profiles of snack consumers influenced by emotions

Understanding these relationships is crucial for developing effective nutritional and mental health strategies, especially during times of health and emotional crises. Further research should focus on identifying the mechanisms underlying these relationships and developing interventions aimed at improving mental health and dietary habits during challenging times, such as pandemics.

Research has shown a significant association between product positioning and visibility in stores, price promotions, and snack consumption (Luick et al., 2023; Piernas et al., 2022; Ravensbergen et al., 2015). While our study did not address this, examining how emotions are influenced at the point of purchase through product availability and presentation could be a valuable direction for future research.

One limitation of our study was its focus on a specific demographic group (adults) and the categorization of snacks limited solely to unhealthy food, characterized by a binary taste designation (sweet/salty). In future research, it would be valuable to include other groups such as children, and adolescents, and also consider a wider variety of types of snacks.

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Ewa Jerzyk — Professor at the Department of Marketing Strategies, Poznań University of Economics and Business, where she leads the Consumer Research Laboratory. Her fields of interest include consumer behaviour (attitudes and predicting behaviour), food market, marketing communications, neuromarketing, packaging (labels, claims, multisensory packaging design), and retromarketing.

Mirosława Kaczmarek — Professor at the Poznań University of Economics. She is involved in research, teaching and supervising master's and doctoral theses. Research interests: Application of statistical methods of multivariate analysis in market research, usability quality of websites, quality of online banking services.

Dobrosława Mruk-Tomczyk — Employed as an assistant professor at the Poznań University of Economics and Business. Her fields of interest include marketing communication, creativity, sustainability, brand management, and consumer behaviour.

Natalia Gluza — Assistant at the Department of Marketing Strategies, Poznań University of Economics and Business, where she is a staff member of the Consumer Research Laboratory. Her fields of interest include consumer attitudes, customer engagement, marketing communications, neuromarketing, and social media's impact on consumer behavior.