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Nodding as a Catalyst for Improving Attitudes and Purchase Intentions in Online Context

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Abstract

This study investigates the influences of the head movement (nodding vs. head shaking vs. nothing) on consumer attitude and purchase intention toward the product in an online shopping context and introduces the consumer motivation (need vs. want) as a moderating factor for this relationship. Through two studies, this article finds that nodding, as opposed to head shaking or no movement, leads to more positive attitudes and higher purchase intentions toward the product, and this effect is strengthened when the shopping is pursued with a need compared to a want motivation. The effect is found specifically in the fashion industry, where online shopping is most prevalent. Both theoretical and practical implications are discussed.

Keywords: Embodied cognition, Consumer behavior, Nodding, Motivation, Priming, Attitude, Purchase intention, Online shopping

1. Introduction

As the digital era unfolds, research on consumer behavior in online contexts is becoming increasingly important. The increasing usage of smartphones by consumers and the advancement of delivery services continue to drive the growth of online shopping. In this process, various shopping platform applications are rapidly emerging and disappearing, while some achieve significant growth through service development. Amidst the rapidly changing behaviors of consumers, shopping platforms are experimenting with various methodologies to enhance consumer convenience and efficiency. In this study, we focus specifically on the non-verbal expression of head movement (i.e., nodding or shaking) while browsing the shopping platform as a precedent factor which can influence the consumer attitude and purchase intention in the online shopping context.

Researchers have investigated the various types of head movement and its impact on human behaviors (Andonova and Taylor 2012; Argyle and Cook 1976; Campos et al. 2000; Holmqvist and Andersson 2017; Matsumoto and Hwang 2013; Riskind 1984; Robson and Bailey 2009; Toiviainen, Luck, and Thompson 2010; Tracy and Matsumoto 2008; van der Wel and Steenbergen 2018). Among them, nodding and head shaking has been the one mostly investigated in the field. Nodding is usually recognized as a gesture of agreement or approval, serving as a powerful means of communication among people, whereas shaking one's head is commonly associated with negative connotations. Even though the meaning of head movements can vary based on cultural characteristics, for instance, head shaking expresses positive meaning in India or Bulgaria, nodding is usually believed to convey positive intention than head shaking.

Given that nodding or shaking one's head implies such positive or negative meanings, whether the head movement influences judgment or choice in consumer behavior is an important research question. However, research on this relationship, especially in online contexts, is still relatively scarce. This paper aims to explore whether nodding or shaking while browsing the website will affect the attitudes and purchase intentions toward the products in an online shopping context, and, introduces the consumer

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motivation (i.e., need or want) as a moderating factor for this relationship.

Through this research, we anticipate gaining a deeper understanding of how embodied cognition, manifested through non-verbal expressions like nodding, impacts consumer behavior such as attitude and purchase intention. Such insights can provide valuable input for formulating marketing strategies and contribute to defining new paradigms in digital marketing.

2. Conceptual background

2.1. The movement of the head

Head movement has been widely investigated in various fields of human behavior (Andonova and Taylor 2012; Argyle and Cook 1976; Campos et al. 2000; Holmqvist and Andersson 2017; Matsumoto and Hwang 2013; Riskind 1984; Robson and Bailey 2009; Toiviainen, Luck, and Thompson 2010; Tracy and Matsumoto 2008; van der Wel and Steenbergen 2018). One stream of research on head movement is focused on its role in collecting visual information and understanding surroundings. This includes studies on eye tracking (Holmqvist and Andersson 2017), spatial perception (Campos et al. 2000), and postural changes (Riskind 1984).

The other stream of research focuses on head movement as a form of nonverbal expression, exploring how it conveys emotions, attention, and intentions in social interaction. For example, studies have examined various types of head movement such as nodding and head shaking (Andonova and Taylor 2012), head tilting (Robson and Bailey 2009), gaze direction and head position (Argyle and Cook 1976; van der Wel and Steenbergen 2018), head bending and lifting (Matsumoto and Hwang 2013), as well as head movements in response to music (Toiviainen, Luck, and Thompson 2010; Tracy and Matsumoto 2008). Research in this stream covers a wide range of everyday head movements individuals engage in.

Among various types of head movement, nodding and head shaking are the most commonly used gestures and are the main focus of this study. Researchers have investigated their impact mainly in face-to-face interaction or conversation. For example, studies on nodding in conversations with real people suggest that it serves as a response to external stimuli in communication. Vertical movements (nodding) are associated with positive responses, while horizontal movements (head shaking) are linked to negative reactions (Bates, Camaioni, and Volterra 1975). Additionally, research has explored nodding as signals of understanding and consent (Bavelas, Coates, and Johnson 2002; Bavelas et al. 2002), indicators of conversation engagement and feedback (Kendon 1967), and manifestations of changes in meaning according to context (McClave 2000).

While the effect of head movement has mainly been found in face-to-face communication, recent research also shows the effect of nodding in non-physical environments where communication occurs with virtual partners in online chatbot systems. Specifically, nodding in computer-generated female figures has been found to enhance attractiveness, increase likability, and influence accessibility perception, while head shaking does not significantly affect ratings (Osugi and Kawahara 2018; Sidner and Lee 2006). However, there is still a lack of research specifically addressing how nodding or head shaking influence consumer behavior, such as product evaluation or purchase intention, in the online shopping context.

2.2. Embodied cognition and consumer behavior

The groundwork for whether head movement influences consumer behavior may be found in the literature on embodied cognition, which suggests that bodily experiences can impact cognitive functions (Barsalou 2008; Cho and Ahn 2020; Goldin-Meadow and Beilock 2010). Research on embodied cognition has predominantly focused on how bodily states or movements impact attitudes, emotions, judgments, and decisions, particularly in the context of persuasive messages or charitable behaviors (Lakoff, Johnson, and Sowa 1999; Landau, Meier, and Keefer 2010; Liljenquist, Zhong, and Galinsky 2010; Spellman and Schnall 2009).

Recently, the field of embodied cognition research has expanded to show the relationship between physical sensations and psychological responses in various contexts (Chandler, Reinhard, and Schwarz 2012; Lee and Schwarz 2011; Min and Kang 2013; Rotman, Lee, and Perkins 2017; Williams and Bargh 2008; Xu, Zwick, and Schwarz 2011; Zhang and Li 2012). These works cover a range of topics, from managing regret through physiological regulation and consumption, promoting interpersonal warmth through physical warmth, judging the importance of content in a book by its physical weight, managing risk-taking behaviors via physical cleansing, to the transition from physical weight to psychological significance.

Also, a growing body of research has explored embodied cognition in the field of consumer behavior showing that sensory perception and bodily interaction can influence product evaluation and even purchase intentions (Ahn 2012; Kim, Han, and Jeon 2019). More specifically, researchers have found that

the way consumers physically interact with products (e.g., touch, taste, smell) (Peck and Childers 2003; Ranaweera, Martin, and Jin 2021), sensory elements (e.g., touch or scent) in advertisements (Krishna and Schwarz 2014; Krishna, Cian, and Aydınoğlu 2017), or the retail environment (e.g., store layout, music, and temperature) (Andreu et al. 2006; Jung and Dubois 2023; Khaneja et al. 2022; Shani-Feinstein, Kyung, and Goldenberg 2022) can influence consumers' perceptions and evaluations of products or their emotions and behaviors affecting purchasing decisions.

All this research suggests that sensory perceptions or bodily interactions can influence consumers in various ways in the consumption context. Based on the literature on embodied cognition, we expect that head movement, especially while shopping in the online context, can be one form of body movement that affects consumer evaluation and purchase decisions. Specifically, given that nodding commonly leads to positive responses whereas shaking leads to negative responses, we predict that nodding will result in higher purchase intention compared to head shaking or no movement.

H1. *The movement of the head will influence the consumer's purchase intention. Specifically, nodding (vs. head shaking or no movement) will lead to higher purchase intention.*

We also propose attitude as a mediating factor leading to purchase intention influenced by head movement. Various studies have confirmed that attitude is a preceding variable essential in forming purchase intention (Spears and Singh 2004; Solomon 2020). Furthermore, it has been revealed that consumers' positive attitudes can lead to purchase intention and actual purchasing behavior (Solomon 2020). For example, if consumers hold a positive attitude toward a specific product, the likelihood of choosing that product increases, whereas if they do not, it decreases. Thus, consumer attitudes may play a crucial role in determining their choices. In this study, we expect differences in attitudes, according to head movement (nodding vs. head shaking vs. no movement), to be reflected in purchase intention.

H2. *The effect proposed in H1 will be mediated by the consumer attitude.*

2.3. Motivation as a moderating variable

The next question is whether nodding will always induce positive attitudes and high purchase intention, and we aim to find the answer from the motivation literature. Research on consumer behavior regarding purchase motivation in online shopping continues to evolve. With the advancement of the internet and sophisticated delivery systems, online shopping has become mainstream, leading to various prior studies structuring consumer purchase motivations diversely.

One study identifying two distinct motivations in the online context distinguished goal-directed and experiential behaviors. Goal-directed behavior refers to behavior guided by an extrinsic goal on websites, whereas experiential behavior refers to behavior without an extrinsic goal or the intention to view specific content but is directed by the process of browsing the website itself (Hoffman and Novak 1996). This relates to a wide range of research in psychology and consumer behavior distinguishing distinctive motivations directing behaviors, such as extrinsic versus intrinsic motivation (Choi and Fishbach 2011; Deci and Ryan 1985; Sansone and Harackiewicz 2014; Shah and Kruglanski 2000), utilitarian versus hedonic values (Dhar and Wertenbroch 2000; Khan, Dhar, and Wertenbroch 2005), need versus want desires (Kardes, Cronley, and Cline 2011), and planned versus impulsive buying (Moon, Jung, and Cha 2022; Sharma, Sivakumaran, and Marshall 2010; Shi and Joo 2023; Zhang and Shrum 2009).

People pursue extrinsic actions to attain external goals, while engaging in intrinsic actions for the reward of engagement itself (Deci and Ryan 1985; Sansone and Harackiewicz 2014; Shah and Kruglanski 2000). In the context of consumer behavior, choosing can be either conducted to satisfy an extrinsic goal such as purchasing a gift or with an intrinsic goal such as simply enjoying the process (Choi and Fishbach 2011).

Literature also distinguishes that consumers may seek either utilitarian value related to a functional benefit or hedonic value related to enjoyable and pleasant benefits (Dhar and Wertenbroch 2000; Khan, Dhar, and Wertenbroch 2005; Sénécal, Gharbi, and Nantel 2002). Specifically, in the online context, utilitarian elements directly influence purchase intention, whereas hedonic elements have a direct impact on search intention or the use of online environments but not purchase intentions (Bridges and Florsheim 2008; Sénécal, Gharbi, and Nantel 2002; To, Liao, and Lin 2007).

Another distinction is about need versus want desires. Regarding the benefits of goods, 'need' can be seen as a necessity, whereas 'want' as something that involves more individual decisions (Dhar and Wertenbroch 2000; Kardes, Cronley, and Cline 2011). In our study, we conceptualize these notions as related to consumers' desires, where a 'need' refers to a desire that humans must fulfill, whereas a 'want'

refers to a desire that humans wish to fulfill (Arndt 1978). These distinct desires may be related to the act of impulsive versus planned buying (Moon, Jung, and Cha 2022; Sharma, Sivakumaran, and Marshall 2010; Shi and Joo 2023), where planned buying is mostly triggered by utilitarian values or need desires, whereas impulsive buying is closely related to hedonic values or want desires.

All this research has addressed the distinctive motivations directing consumer behavior. In a situation where a person needs a gift for a friend, shopping or browsing the website is a planned buying driven by extrinsic motivation that a person needs to conduct. On the contrary, when a person just browses the sites for free time, the activity is driven by intrinsic motivation that a person wants to conduct, which may lead to impulsive buying. Thus, the action of shopping or browsing the website may have different implications based on the two distinct motivations. In this study, we conceptualize the major concepts of 'want' and 'need' within consumer purchase motivations.

A relationship between motivation and attitudes has also been proven in past literature. While motivation signifies an individual's inclination to perform a specific action, attitudes represent an individual's predisposition toward that action. In other words, an individual's motivation can influence the formation of their attitudes, and conversely, their attitudes can either stimulate or inhibit their motivation (Eagly and Chaiken 1993; Katz 1960). Ultimately, if attitude differs on motivation, it will also affect purchase intention.

Based on this, we predict a more positive attitude and higher purchase intention in shopping for 'need' compared to 'want'. Firstly, because 'need' provides more justification to the consumer compared to 'want'. According to preceding studies, if consumers are given the justification that they need a certain product, they are more willing to spend more money even for utilitarian products (Okada 2005). Secondly, motivation based on 'need' is considered an essential requirement that needs to be urgently addressed, thus people instinctively prioritize 'need'. On the other hand, 'want' is perceived as having relatively no time constraints, allowing for more flexible decision-making (Krishna et al. 2017; Zhang and Wang 2023). In this study, therefore, we predict that motivation will moderate the effect of head movement on attitude and purchase intention, where the effect will be strengthened when shopping is driven by need (vs. want) motivations.

H3. *The effect proposed in H1 will be moderated by the motivation (need vs. want). Specifically, the effect will be strengthened under need (vs. want) motivation.*

2.4. Conceptual framework (Figure 1)

2.5. Purpose of the study

The scarcity of research on the direct relationship between nodding and consumer behavior is evident, as the majority of existing studies have primarily focused on nodding within the context of conversations or communications. There is a notable gap in research that delves specifically into the act of nodding, its nuances, and its impact when considered independently of broader conversational settings. Furthermore, within the realm of consumer behavior, there is a deficiency in empirical research. While some studies have involved participants by soliciting their opinions after nodding and shaking their heads, there is a notable absence of research that directly examines nodding from the consumers' perspective. For instance, a study conducted by Wells and Petty (1980) found that participants who engaged in nodding on social issues, such as tuition cuts, were more inclined to agree with the opinions

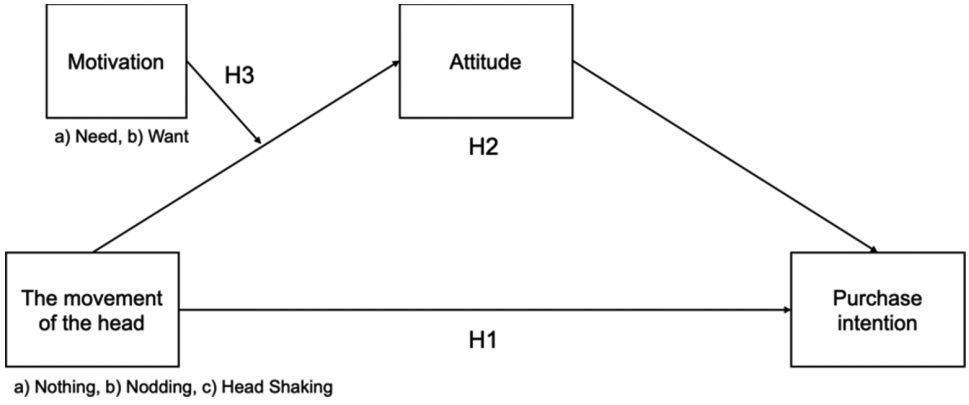


Fig. 1. Conceptual framework.

presented compared to those who performed head shaking. However, such research represents a limited exploration of nodding's role in consumer attitudes and decision-making, emphasizing the need for more comprehensive investigations into the specific impact of nodding within consumer behavior contexts.

Thus, this study intends to explore the effect of head movement on consumer attitude and purchase intention as a form of embodied cognition in the online context. Specifically, Study 1 manipulates participants' head movement by letting them nod, shake, or do nothing while browsing the internet shopping site and measures the attitude and purchase intention toward the products. By figuring out that nodding, as opposed to head shaking or no movement, leads to more positive attitudes and higher purchase intentions toward the product, we can demonstrate that nodding can directly influence attitude and purchase intention not only in physical retail but also in online contexts, holding significant importance.

Also, this paper suggests motivation (need vs. want) as a moderator for the relationship between the movement of the head (nodding vs. head shaking vs. nothing) and attitude. Specifically, Study 2 intends to find the moderating role of motivation, where motivation to do shopping was manipulated either as a need or want. It will confirm that consumer motivation, which has been studied for a long time, is a crucial boundary condition for embodied cognition changing consumers' attitude and purchase intention.

3. Study 1

Study 1 aims to investigate whether the attitudes and purchase intentions in online shopping context differ based on the movement of the head (nodding vs. head shaking vs. nothing). The study utilizes stimuli related to the fashion industry, where online shopping is most prevalent.

3.1. Method

3.1.1. Participants and design

The experiment for this study was conducted using a survey created with Qualtrics. The study employed a 3 (nodding vs. head shaking vs. nothing) between-subjects design, with the research centered around a sample randomly selected from Prolific. As mentioned earlier, nodding has different meanings depending on culture, so a pre-screening was conducted to select participants with the same cultural background. The study targeted individuals with English as their native language and IP addresses in the United States and the United Kingdom. The experimental process was as follows:

Table 1. Demographics (Study 1).

Gender	Group	Frequency	Valid percent
Female	Nothing	15	33.3
	Nodding	16	35.6
	Head shaking	14	31.1
	Total	45	100
Male	Nothing	14	35
	Nodding	13	32.5
	Head shaking	13	32.5
	Total	40	100

First, to minimize attitude differences based on participant preferences, participants were asked to choose an internet shopping mall. The types of malls were selected through a pre-test after investigating recent trends in fashion categories, resulting in seven options (e.g., shoes collection, autumn office look, black chic modern look, denim, summer dress, kitschy, sportswear). Subsequently, three treatments were randomly assigned to create groups. To present the same situation to each group, common fashion-related knowledge was provided, and participants were asked to click yes or no buttons. If 'yes' was chosen, participants were instructed to nod five times, and if 'no' was chosen, they were instructed to shake their heads five times. Participants assigned to the 'nothing' condition were given a fashion-related sentence of similar length to read, and no specific action was required. Four questions were then presented repeatedly (20 times of nodding or head shaking). Following this, the selected type of internet shopping mall page was provided, allowing participants to browse for 20 seconds. After browsing, attitudes, purchase intentions, and questions containing control variables were measured. Basic demographic questions were then administered, and the process concluded.

The results of the frequency analysis conducted to examine the general characteristics of the study participants are presented in the following table (Table 1). The gender distribution included 40 males (44%) and 45 females (56%), with random assignment. While 90 responses were collected, five missing values were excluded based on the researcher's judgment, resulting in a total of 85 responses for data analysis.

3.1.2. Construction of stimulus materials

Independent variable. 'Nodding' is a gesture that at least once there is a movement to lower the head and then immediately back to its original, except for lifting or lowering the head and facing forward from top or bottom in a positive meaning (Maynard 1988). 'Head shaking' is a gesture that repeatedly shakes the head quickly to the left and right in a negative meaning (Merriam-Webster). 'Nothing' is the way we

are normally without any movement in a neutral meaning.

Dependent variable. 'Attitude' is a stimuli of an online shopping mall evaluation on seven scale items (Fiore, Yah, and Yoh 2000; Sengupta and Johar 2002). For example, there are 'pleasant', 'credible', 'positive attributes', 'good', 'useful', 'very favourable' (1 = "strongly disagree," and 7 = "strongly agree"). 'Purchase intention' is a willingness of a customer to buy a certain product in online stimuli on seven scale items (Rodgers 2003; Fiore et al. 2000). For example, there are 'I would buy this one rather than any other one available', 'I am willing to recommend others to buy from this page', 'I intend to purchase this one in the future', 'I'm like to make a purchase', 'I would like to have more information', 'I'm interested in the brand' (1 = "strongly disagree," and 7 = "strongly agree").

In order to validate the reliability of the variables used in this study, exploratory factor analysis was conducted using principal component analysis and varimax rotation. The factor categorization was determined based on whether the factor loading exceeded .40. The Internet shopping mall attitude comprised a total of six items. The factor analysis results indicated a Kaiser-Meyer-Olkin (KMO) measure of .917, and Bartlett's sphericity test yielded a significant result ($p < .001$), confirming the suitability for factor analysis. All items met the criterion for factor loading, and no items were removed. The analysis revealed two factors with a cumulative variance ratio of 4.546, indicating satisfactory explanatory power (Hair et al. 1998). Purchase intention consisted of a total of five items. The factor analysis results showed a KMO measure of .868, and Bartlett's sphericity test was significant ($p < .001$), indicating suitability for factor analysis. All items met the criterion for factor loading, and no items were removed. The analysis revealed two factors with a cumulative variance ratio of 3.983, indicating satisfactory explanatory power (Hair et al. 1998).

To assess the consistency of respondents' responses in the scale used in this study, a reliability analysis was conducted using Cronbach's alpha. The reliability criterion was set at a Cronbach's alpha value higher than 0.6 (Hair et al. 1998). The alpha value for Internet shopping mall attitude was .807, confirming good reliability. The alpha value for purchase intention was .935, indicating excellent reliability.

3.2. *Results*

This study conducted one-way ANCOVA to examine the differences in attitude and purchase intention among three groups categorized by nodding, head shaking, and nothing. The inter-group differences were statistically significant ($F = 5.623$, $p < .05$). Post-hoc tests (Scheffe) revealed significant differences between nodding and head shaking, as well as between nodding and nothing. However, no significant difference was found between head shaking and nothing. The results indicated that attitude was higher for nodding ($M = 5.53$, $SD = 1.038$) compared to head shaking ($M = 4.93$, $SD = .971$) and nothing ($M = 5.02$, $SD = 1.039$). Similarly, purchase intention was higher for nodding ($M = 4.72$, $SD = 1.620$) compared to head shaking ($M = 4.22$, $SD = 1.222$) and nothing ($M = 4.55$, $SD = 1.190$).

Control variables. The concept of embodied cognition seeks to overcome the limitations of traditional cognitive science, which is based on a dichotomy between mind and body, by emphasizing the interaction among the human mind, body, activity, and environment. This approach attempts to integrate these elements rather than adhering to the traditional dualistic thinking that separates mind and body. Manipulating 'mood' and 'knowledge' aligns with the principles of embodied cognition and can aid in understanding and enhancing cognitive processes (Veenstra, Schneider, and Koole 2017). For instance, our mood influences cognitive processes, and conversely, cognitive processes can impact our mood. Understanding such interactions and controlling for them as experimental control variables can be crucial.

Moreover, participants' existing knowledge plays a significant role in guiding our cognitive processes (Tables 2 and 3). By manipulating knowledge, we can more effectively comprehend and integrate new information, optimizing our cognitive abilities. Since knowledge is crucial in various cognitive tasks such as learning, memory, and problem-solving, it is set as a control variable to be controlled for and excluded during experimentation.

Furthermore, to explore the mediating effect of attitude in the relationship between nodding and purchase intention, we conducted a multiple mediation analysis using the PROCESS macro model 4. The results are presented in Fig. 2 for nodding versus nothing and Fig. 3 for nodding versus head shaking. The Bootstrapping test was employed to confirm

Table 2. Attitudes in online context to the between groups of embodied cognition including control variables (Study 1).

	Mean	Std. error	F	df	Sig.	P.E.S.
knowledge	.161*		6.787		.011	
mood	.295*		10.262		.002	
Group			5.623	2	.005	.123
Nothing	4.969**	.190				
Nodding	5.570**	.132				
Shaking	4.888**	.194				

*B.

**Estimated marginal means.

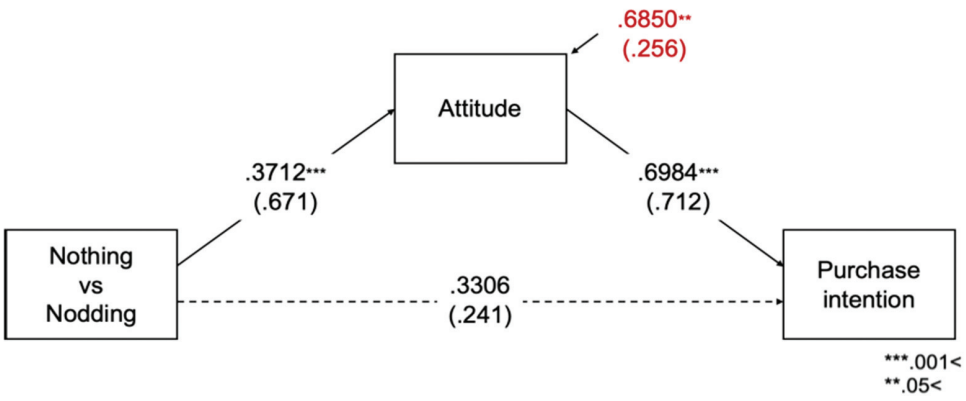


Fig. 2. Regression analysis of nodding versus nothing.

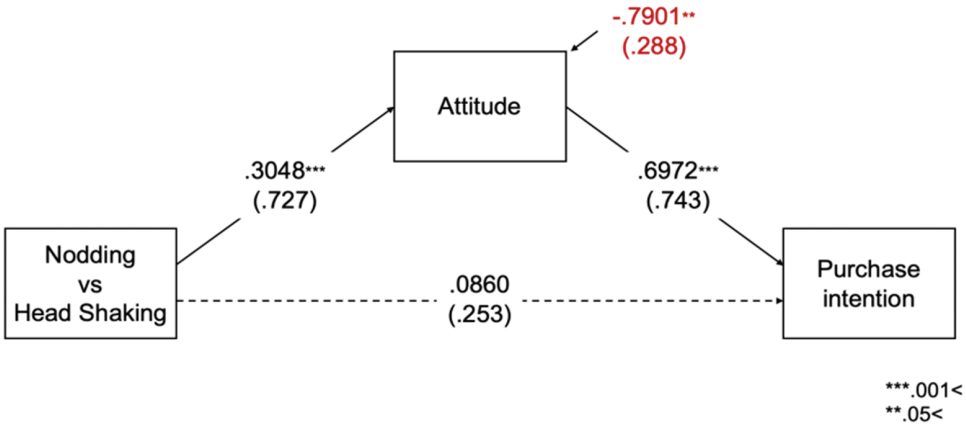


Fig. 3. Regression analysis of nodding versus head shaking.

Table 3. Purchase intentions in online context to the between groups of embodied cognition including control variables (Study 1).

	Mean	Std.Error	F	df	Sig.	P.E.S.
knowledge	.333*		8.437		.022	
mood	.310*		8.093		.025	
Group			5.623	2	.125	.051
Nothing	4.437**	.273				
Nodding	4.814**	.189				
Shaking	4.130**	.279				

*B.
**Estimated marginal means.

Table 4. The mediating effect of attitude in the regression analysis of nodding versus nothing.

Effects	B	S.E.	LLCI	ULCI
Direct	−.33	.24	−.8134	.1522
Indirect				
X → M	.60	.22	.1566	1.0418
X → M → Y	.69	.26	.2008	1.1973

Table 5. The mediating effect of attitude in the regression analysis of nodding versus head shaking.

Effects	B	S.E.	LLCI	ULCI
Direct	.09	.25	−.4207	.5927
Indirect				
X → M	−.69	.23	−1.1597	−.2227
X → M → Y	−.79	.26	−1.3522	−.1992

the mediating effects, as shown in the Table 4 and Table 5 below. In interpreting the results of the Bootstrapping test, significance was considered when the confidence interval (CI) did not include zero. The analysis indicated significant mediating effects for nodding and nothing, as well as nodding and head shaking. Ultimately, it can be concluded that attitude fully mediates the relationship between the movement of the head (nodding vs. head shaking and nodding vs. nothing) and purchase intention.

4. Study 2A

The objective of Study 2A is to examine the attitudes and purchase intentions in online context based on consumer purchasing motivations. Additionally, within this context, we aim to investigate whether

Table 6. Demographics (Study 2).

Gender	Motivation	Group	Frequency	Valid percent
Female	Need	Nothing	18	20
		Nodding	13	14.4
		Head shaking	14	15.6
	Want	Nothing	19	21.1
		Nodding	13	14.4
		Head shaking	12	13.3
		Total	90	100
Male	Need	Nothing	16	18
		Nodding	15	16.9
		Head shaking	16	18
	Want	Nothing	13	14.6
		Nodding	15	16.9
		Head shaking	15	16.9
		Total	89	100
	Total		179	

Table 7. Attitudes in online context to the between groups of embodied cognition and motivation (Study 2).

	Mean	std	F	df	Sig.	P.E.S.
Need						
Nodding	5.868	.499				
Shaking	5.310	.568				
Nothing	5.324	.624				
Want			1.537	2	.218	.017
Nodding	4.780	.741				
Shaking	4.630	.619				
Nothing	4.510	.704				

there are variations in attitudes and purchase intentions based on the movement of the head (nodding vs. head shaking vs. nothing) as an embodied cognition.

4.1. Method

4.1.1. Participants and design

The results of the frequency analysis conducted to examine the general characteristics of the study participants are presented in the following table (Table 6). Gender distribution included 89 males (49.7%) and 90 females (50.3%), with random assignment. The main stimuli for the study, conducted in the context of fashion similar to Study 1, involved several modifications for Study 2. Since the 'need' and 'want' were introduced, the original selection regarding internet shopping malls was removed, and stimuli related to 'want' and 'need' were added. This study employed a 3 (nodding vs. head shaking vs. nothing) × 2 (need vs. want) mixed design with the number of choices as a between-subject factor. The experiment proceeded as follows:

Firstly, participants were randomly assigned to groups, and nodding, head shaking, and nothing procedures were carried out as previously described. Subsequently, 'need' and 'want' were also randomly assigned to prime participants with different situations.

To minimize individual preferences, colors were selected as black, white, and navy, and stimuli were created accordingly. Following this, attitudes, purchase intentions, and control variables were measured for the same items.

4.1.2. Construction of stimulus materials

Based on the conceptual background, 'need' refers to a goal-directed behavior driven by an extrinsic goal to purchase something where a person needs a product, whereas 'want' refers to an experiential behavior driven by an intrinsic goal without a need to purchase something, where a person just wants to browse the website during free time. In this context, participants were presented with stimuli that conveyed the following scenario: 'Imagine that you don't actually need a round-neck T-shirt. Instead, you're browsing the internet shopping mall because you have free time'.

Similarly, the concept of 'need' was also primed with stimuli that presented the scenario: 'Imagine that you really need a round-neck T-shirt. You're browsing an internet shopping mall to find the perfect garment to purchase'. The intention was to provide participants with specific mental cues or contexts related to either wanting or needing a round-neck T-shirt, as per the experiential choice framework.

4.2. Results

We figure out that the control variables used for the study 1 have no impact on the Study 2. To examine the differences in attitude and purchase intention among groups, one-way ANOVA was conducted. First, regarding attitude, there was a statistically significant difference among groups and non-significant groups ($F = 1.537$, $p > .05$). Post-hoc tests revealed that the difference between nodding and head shaking was significant ($p < .05$) and nodding and nothing also showed a significant difference ($p < .05$). However, no significant difference was found between head shaking and nothing Table 8. As seen in Table 7, the overall mean attitude indicated that the need group ($M = 5.49$, $SD = .619$) had higher attitudes compared to the want group ($M = 4.63$, $SD = .693$). Upon closer inspection, within the need group, the nodding group ($M = 5.87$, $SD = 499$) showed higher attitudes than head shaking ($M = 5.31$, $SD = .568$) and nothing ($M = 5.32$, $SD = 624$) Fig. 4. Similarly, within the want group, the nodding group ($M = 4.78$, $SD = .741$) exhibited higher attitudes than head shaking ($M = 4.63$, $SD = .619$) and nothing ($M = 4.51$, $SD = .704$) Fig. 4.

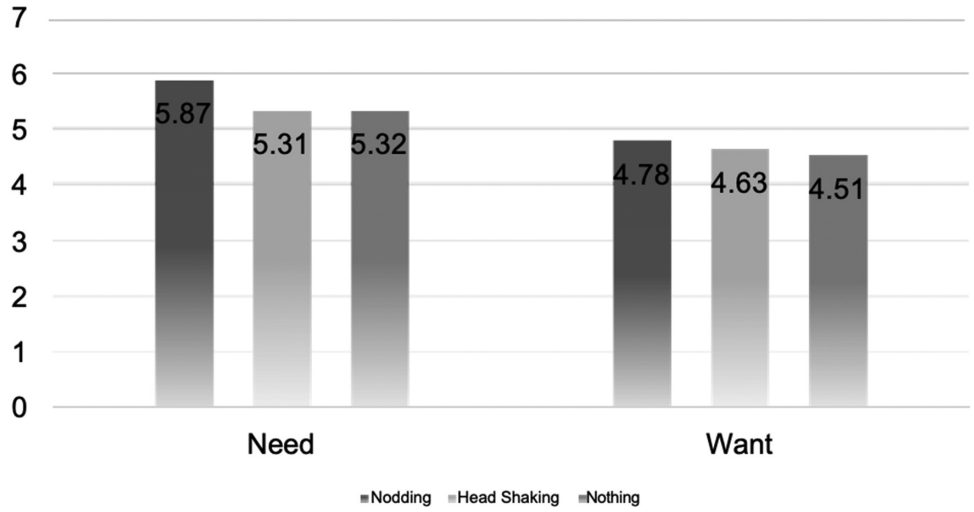


Fig. 4. Attitudes in online context to the between groups of embodied cognition and motivation (Study 2).

Table 8. Post HOC test for ANOVA.

(I) Group	(J) Group	Mean difference (I − J)	Std. Error	Sig.
Nodding	Head shaking	.3512**	.119	.014
	Nothing	.4040**	.114	.002
Head shaking	Nodding	−.3512**	.119	.014
	Nothing	.0528	.115	.899
Nothing	Nodding	−.4040**	.114	.002
	Head shaking	−.0528	.115	.899

5. Study 2B

In Study 2B, study objective is to examine whether the purchase intentions in online context also differs based on consumer purchasing motivations. Additionally, within this context, we aim to investigate whether there are variations in attitudes and purchase intentions based on the movement of the head (nodding vs. head shaking vs. nothing).

5.1. Method

5.1.1. Participants and design

The results of the frequency analysis conducted to examine the general characteristics of the study participants are presented in the following table (Table 9). Gender distribution included 129 males (48.1%) and 139 females (51.9%), with random assignment. The main stimuli for the study, conducted in the context of fashion same as Study 2. This study employed a 3 (nodding vs. head shaking vs. nothing) × 2 (need vs. want) mixed design with the number of choices as a between-subject factor. The experiment proceeded as follows:

Firstly, participants were randomly assigned to groups, and nodding, head shaking, and nothing procedures were carried out as previously described. Subsequently, 'need' and 'want' were also randomly assigned to prime participants with different situations.

To minimize individual preferences, colors were selected as black, white, and navy, and stimuli were created accordingly. Following this, purchase intentions, and control variables were measured for the same items.

Table 9. Demographics (Study 3).

Gender	Motivation	Group	Frequency	Valid percent
Female	Need	Nothing	31	22.8
		Nodding	22	16.2
		Head shaking	20	14.7
	Want	Nothing	17	12.9
		Nodding	23	17.4
		Head shaking	26	19.7
	Total	139	100	
Male	Need	Nothing	23	16.9
		Nodding	20	14.7
		Head shaking	20	14.7
	Want	Nothing	26	19.7
		Nodding	19	14.4
		Head shaking	21	15.9
	Total		129	100
Total			268	

5.2. Results

The hypothesized moderated mediation model was tested in a single model using a bootstrapping approach to assess the significance of the indirect effects at differing levels of the moderator (Hayes 2013). The movement of the head was the predictor variable, with attitudes as the mediator. We transformed the variable 'the movement of the head' into dummy

Table 10. Results on conditional indirect effects of the moderated mediation.

(I) Group	(J) Group	Moderator	B	Std.Error	LLCI	ULCI
Nodding	Head shaking	Need	−.387*	.131	−.655	−.139
		Want	−.096	.150	−.394	−.202
	Nothing	Need	−.480*	.154	−.785	−.183
		Want	−.320*	.147	−.611	−.033

variables to convert it into a multicategorical variable, and subsequently conducted regression analysis. The outcome variable was purchasing intention and motivation was the proposed moderator. Moderated mediation analyses test the conditional indirect effect of a moderating variable (i.e., motivation) on the relationship between a predictor (i.e., nodding vs. head shaking vs. nothing) and an outcome variable (i.e., purchase intention) via potential mediators (i.e., attitude). The "PROCESS" macro, model 7, v2.16 (Hayes 2013) in SPSS ver. 23 with bias-corrected 95% confidence intervals (n = 5000) was used to test the significance of the indirect (i.e., mediated) effects moderated by motivation (i.e., need vs. want). This model explicitly tests the moderating effect on the predictor to mediator path. An index of moderated mediation was used to test the significance of the moderated mediation, i.e., the difference of the indirect effects across motivation (Hayes 2013).

Attitude was found to moderate the movement of the head (nodding vs. head shaking, nodding vs. nothing) and purchase intention as Study 2B found out (B = −.387, SE = .131, LLCI = −.655, ULCI = −.139; B = −.480, SE = .154, LLCI = −.785, ULCI = −.183). Need was associated with better attitude than want in both comparisons (Table 10). As zero is not within the CI this indicates a significant moderating effect of motivation on the movement of the head (nodding vs. head shaking, nodding vs. nothing) on the indirect effect via purchase intention (Hayes 2013). The conditional indirect effect was strongest in need context when the participants nodded.

In conclusion, nodding has the most significant impact when participants engage in situations where they express a need for the product.

6. Discussion and implications

In this article, we examined whether nodding or shaking while browsing the website will affect attitudes and purchase intentions toward products in an online context through two studies. Additionally, we explored the motivation for shopping (i.e., need vs. want) as a moderating factor for the influence of head movement on consumer attitude and purchase intention. In this process, meaningful results were obtained regarding gestures as embodied cognition in consumer behavior research, providing insights into non-verbal expressions.

Contrary to a few exceptions in certain countries like India and Bulgaria, this study found that nodding, globally recognized as a positive gesture, tends to elicit a more positive attitude compared to head shaking or taking no action. Additionally, there is no significant relationship between head shaking and taking no action, suggesting that head shaking does not inherently carry a more negative meaning than taking no action. Instead, it suggests that the act of nodding itself, as an embodied cognition, is important in boosting attitudes and purchase intentions in a positive way. Moreover, a significant result indicates higher attitudes when there is a distinct motivation, such as 'need' compared to 'want'. Importantly, it was observed that nodding can induce a positive attitude and purchase intention even when consumers do not have any specific goals while browsing the internet shopping mall.

Building on previous research suggesting attitudes as antecedents to purchase intentions, this article obtained similar results in the context of purchase intentions. While purchase intentions were generally lower than attitudes, the tendencies observed across the nodding, head shaking, and nothing groups were similar. There is a significant result indicating that motivation (need vs. want) works as a moderated mediation in the contextual framework. Specifically, as indicated by the descriptive results, it was observed that engaging in embodied cognition, especially nodding, in situations where consumers have a motivational aspect associated with their consumption leads to significantly more positive attitudes and purchase intentions in an online context.

Based on this study, the theoretical implications and practical implications are as follows.

6.1. Theoretical implications

This research aims to contribute to the growing field of embodied cognition within the context of online consumer behavior, with a specific focus on the underexplored phenomenon of nodding. It is the first study to demonstrate that nodding can directly influence attitude and purchase intention not only in physical retail but also in online contexts, holding

significant importance. This research suggests that consumer motivation, which has been studied for a long time, is a crucial boundary condition for embodied cognition changing consumers' attitudes and purchase intentions. Traditionally associated with social interactions and discourse, this study extends its examination to self-nodding during decision-making processes, particularly in the realm of online shopping. The primary objective is to investigate whether nodding to oneself influences attitudes and purchase intentions for an online shopping mall. Positioned at the intersection of embodied cognition and consumer behavior, this study seeks to fill a gap in the existing literature by providing empirical evidence regarding the impact of self-nodding on consumer decision-making. As significant results are obtained from the experiments, this research is poised to make a pioneering contribution to the field of embodied cognition, particularly in relation to head movements and their implications for consumer behavior research.

Novelty in study scope. This research breaks new ground by exploring nodding behavior beyond its conventional role in social interactions. By delving into the realm of nodding, contrasting it with head shaking and the absence of such movements, during online decision-making processes, the study expands the understanding of nodding as a cognitive and behavioral phenomenon.

Empirical exploration of head movements in consumer behavior. The study aims to offer the first empirical evidence in a field related to head movements, specifically examining consumer behavior. While existing research has explored various aspects of embodied cognition, the specific focus on head movements in the context of consumer decision-making represents an innovative contribution.

6.2. Practical implications

Incorporating nodding as a strategy in online shopping environments holds significant potential for enhancing consumers' attitudes and purchase intentions. Particularly, this study yielded results indicating that the simple act of nodding amplifies consumer attitudes regardless of the context. This innovative approach can be particularly valuable for practitioners in marketing and advertising. Here are key managerial implications for leveraging nodding as a strategic tool.

First of all, this study provides important insights into online shopping dynamics. As online shopping becomes an increasingly dominant mode of consumer engagement, understanding the cognitive processes underlying decision-making in this context is crucial. This research aims to contribute insights into how self-nodding may influence perceptions and intentions in the online shopping environment. By exploring and advancing the understanding of embodied cognition in the realm of online consumer behavior, this study investigates the role of nodding—a ubiquitous yet understudied behavior. Through empirical insights into the relationship between self-nodding and decision-making, the study seeks to contribute valuable knowledge with potential applications in marketing, design, and consumer behavior.

Also, this study helps consumer attitude enhancement in marketing tactics. *Strategic integration*. Marketing teams can incorporate nodding as a deliberate element in online marketing campaigns. They can utilize visual cues, such as nodding animations or interactive features, to encourage users to subconsciously engage in nodding behavior during their online shopping journey. Especially in motivation, it would be beneficial to develop strategies in channels like home shopping that sell products within a limited time. Particularly in South Korea, housewives, who often purchase necessities through home shopping, could contribute to sales if research is conducted on strategies to induce nodding using show hosts or filming techniques. *Positive reinforcement*. Marketing teams can also strategically implement nodding in promotional content or product displays to reinforce positive consumer attitudes. This can be particularly effective in highlighting product benefits, promotions, or user reviews, creating a more engaging and positive online shopping experience.

Third, this study expands an embodied cognition as a new strategy. *Interactive advertising campaigns*. When planning interactive advertising campaigns, consider incorporating nodding as a consumer attitude booster. Developing interactive elements that encourage users to nod in agreement or approval can create a sense of active participation and connection with the brand or product, providing consumers with positive attitudes. *Pop-up stores and limited time offers*. In the context of pop-up stores or limited time offers, utilize nodding as a means to induce consumer participation. For instance, design interactive features within the pop-up experience that prompt users to nod in response to exclusive deals or personalized offers, fostering a sense of exclusivity and engagement.

Fourth, this study starts a domain of user engagement in virtual or artificial environments. *Virtual shopping experiences*. In virtual or artificial shopping environments, it might be interesting to explore the integration of nodding as a user engagement tool. For example, enabling users to virtually nod in agreement or preference when exploring products can create a

more immersive and personalized online shopping experience. *Customization and feedback loops*. Practitioners can implement nodding as part of a feedback loop in which users' nods are acknowledged and responded to in real-time. This not only enhances user engagement but also provides valuable data on consumer preferences and attitudes, informing future marketing strategies.

Finally, this study discusses a multichannel consistency. *Consistent branding*. UI/UX designers can ensure consistency in the use of nodding across various online channels and touchpoints. This consistency reinforces brand identity and creates a seamless and recognizable user experience, contributing to long-term positive associations with the brand.

In conclusion, incorporating nodding as a strategic tool in online marketing and advertising campaigns can contribute to a more engaging, positive, and personalized shopping experience. By understanding and leveraging the psychological impact of nodding, practitioners can enhance consumer attitudes and ultimately drive purchase intentions in the competitive landscape of online retail.

6.3. Limitations and future research

Cultural variations. Cultural differences in the interpretation of non-verbal expressions, including nodding, may impact the generalizability of the study's findings. The research was conducted in a specific cultural context, and variations in how nodding is perceived across cultures could influence the effectiveness of the strategy. Further research is needed to explore the cross-cultural applicability of nodding as a consumer behavior influencer. For future research, it would be beneficial for researchers to conduct cross-cultural studies to examine how nodding as a strategy influences consumer behavior across diverse cultural contexts. Understanding how cultural variations impact the effectiveness of nodding will inform localization strategies for its implementation in global markets.

Limited duration of observation. The article focused on the short-term effects of nodding during online shopping, providing insights into immediate reactions. However, the transient nature of the observed effects raises questions about the sustainability of the strategy over extended shopping durations. Future research should investigate the longitudinal impact of nodding to understand its efficacy in shaping consumer attitudes and behaviors over an extended period. We anticipate that by extending the duration, we can confirm the influence of the previously mentioned motivation as a moderated mediation on purchase intention.

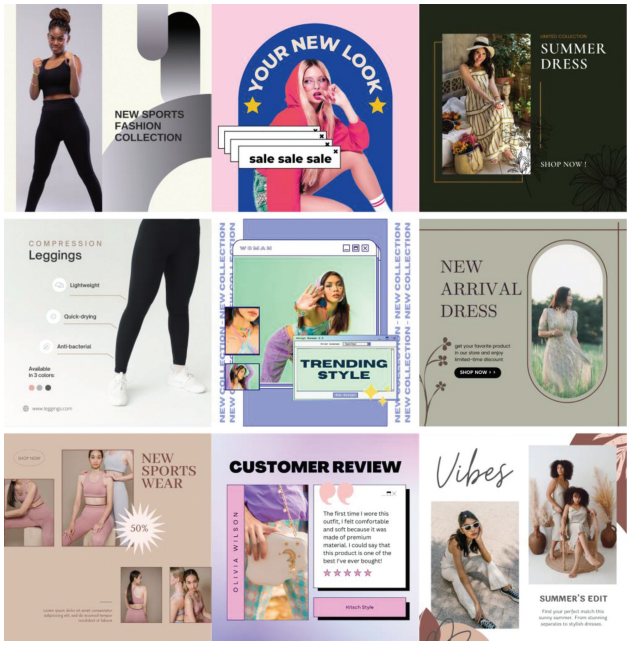
The need for tool development. The study, being an early exploration, did not involve continuous execution of nodding throughout the entire shopping process. The feasibility and realism of implementing nodding as a continuous tool during online shopping need to be addressed. For more practical implementation, it is better to develop and test practical tools or interventions that enable the continuous execution of nodding during online shopping. This involves integrating nodding seamlessly into the user interface and experience, ensuring that it aligns with user expectations and enhances the overall shopping process.

By exploring the combined impact of various non-verbal cues, such as nodding and facial expressions, to enhance the richness of the online shopping experience, more meaningful results can be obtained for the study of embodied non-verbal cues. For future research, it is important to investigate how the integration of multiple non-verbal expressions can synergistically influence consumer perceptions and behaviors. Also, by addressing these research limitations and pursuing these further research directions, researchers can contribute to a more comprehensive understanding of the role of nodding in online consumer behavior and facilitate the development of practical, culturally sensitive strategies for its implementation in the dynamic landscape of online shopping.

Appendix

A. Experimental stimuli

A.1 Stimuli for Study 1



A.2 Stimuli for Study 2

Conflict of interest

The authors declare that there is no conflict of interest.

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