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Beyond the Coffee Cup

Investigating the Effects of Breaking Functional Fixedness on Consumer Decision-Making in Social Media Advertising

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Abstract

This thesis explores the impact of breaking functional fixedness in social media advertisements on consumer engagement, product recall and purchase intention, addressing the research question: how does breaking functional fixedness affect consumer decision-making processes?

Using a sample of 147 participants divided into experimental and control groups, the study employed a survey-based experimental design to assess cognitive engagement, recall and purchase intentions using validated scales and mediation analysis. The results show that breaking functional fixedness increases cognitive engagement and product recall, but does not significantly affect purchase intentions. These findings suggest that, while behavioural outcomes may need to be aligned with consumer motivations and preferences, strategies that break functional fixedness can foster deeper engagement.

This study contributes to the dual-process theory literature and advertising creativity research, and provides practical insights for the design of innovative advertisements. Future research should explore the interplay between creative strategies, such as breaking functional fixedness, and other factors, such as emotional and motivational drivers, to better understand their role in shaping consumer behaviour.

Keywords: Functional fixedness, cognitive engagement, product recall, purchase intentions, social media advertising, consumer behavior, creative advertising

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Resumo

Esta tese explora o impacto da quebra da fixidez funcional nos anúncios das redes sociais no envolvimento do consumidor, na recordação do produto e na intenção de compra, abordando a questão de investigação: Como é que a quebra da fixidez funcional afecta os processos de tomada de decisão do consumidor?

O estudo utilizou um modelo experimental baseado num inquérito para avaliar o envolvimento cognitivo, a recordação e a intenção de compra, utilizando escalas validadas e uma análise de mediação. Os resultados mostram que a quebra da fixidez funcional aumenta o envolvimento cognitivo e a recordação do produto, mas não afecta significativamente as intenções de compra e pode precisar de ser alinhada com as motivações e preferências do consumidor para os resultados comportamentais.

Este estudo contribui para a literatura sobre a teoria do duplo processo e para a investigação sobre a criatividade publicitária, e fornece informações práticas para a conceção de anúncios inovadores. A investigação futura deve explorar a interação entre estratégias criativas, como a quebra da fixidez funcional, e outros factores, como os factores emocionais e motivacionais, para melhor compreender o seu papel na formação do comportamento do consumidor.

Palavras-chave: fixação funcional, envolvimento cognitivo, recordação do produto, intenções de compra, publicidade nas redes sociais, comportamento do consumidor, publicidade criativa.

Título:

Para além da chávena de café

Investigando os efeitos da quebra da fixidez funcional na tomada de decisão do consumidor na publicidade nas redes sociais.

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List of Abbreviations

Ad	Advertisement
AI	Artificial Intelligence
BGC	Brand-Generated Content
b	Unstandardized Regression Coefficient
β	Standardized Regression Coefficient
CE	Cognitive Engagement
CI	Confidence Interval
CRT	Cognitive Reflection Test
DV	Dependent Variable
EF	Executive Functions
e.g.	For example (*exempli gratia*)
GPT	Generic-Parts Technique
i.e.	That is (*id est*)
IBM	International Business Machines (SPSS provider)
IV	Independent Variable
LLCI	Lower Level Confidence Interval
M	Mean
M1	Mediator 1 (Cognitive Engagement)
M2	Mediator 2 (Product Recall)
n	Sample Size
PANAS	Positive and Negative Affect Schedule
PI	Purchase Intentions
PR	Product Recall
p	Probability Value (p-value)
SD	Standard Deviation
SE	Standard Error
SPSS	Statistical Package for the Social Sciences
UGC	User-Generated Content
ULCI	Upper Level Confidence Interval
USP	Unique Selling Proposition
Z	Z-Score (Standard Score)

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1. Introduction

The average attention span for adult users scrolling through social media for a piece of content is as short as 1.7 seconds (Facebook IQ, 2016), and this figure drops to 1.3 seconds when the target audience is Gen Z for social media advertisements (Sullivan, 2022). Furthermore, the speed of scrolling on mobile devices is approximately 41% faster than on desktop computers, which presents an additional challenge for advertisers attempting to make an impression within the limited time available (Facebook, n.d.). Given this short attention span, how can brands effectively capture the audience's attention on social media platforms in such a short time?

In today9s fast-paced digital environment, capturing and maintaining consumer attention has become more and more critical for brands. Traditional visibility is no longer enough; brands must go beyond passive scrolling by employing high-impact formats that resonate with consumers, particularly younger audiences like Gen Z, who have shorter attention spans. By paying attention to a message, the individual is more likely to retain it, and the marketer can subsequently use the data to facilitate the growth of the brand (Sullivan, 2022).

This research aims to capture consumers' attention and engage them more deeply and critically with the content they encounter through an innovative approach based on cognitive psychology. The proposed method makes use of the concept of functional fixedness, a cognitive bias that restricts individuals to perceiving objects or concepts only within their conventional uses (Duncker, 1945; McCaffrey, 2012). By challenging these fixed perceptions and presenting products in novel, unconventional ways, advertisers may be able to stimulate deeper cognitive processing and drive greater engagement by encouraging a more deliberate and attentive thinking and decision-making process (Kahneman, 2011). Building on the approach outlined, in this thesis I will investigate the following research question: How does breaking functional fixedness in social media advertisements effect consumer engagement and decision-making? Further, I analyze whether breaking functional fixedness increases cognitive engagement and product recall. In addition, I analyze if breaking functional fixedness has an effect on purchase intentions and if it is mediated by cognitive engagement and product recall.

This research is of significance to both academic and managerial audiences. From an academic standpoint, the study addresses a gap in the existing literature on the impact of functional fixedness in advertising. Although this cognitive bias has been explored in fields such as psychology and problem-solving, its direct application in marketing and advertising remains underexplored.

Understanding how cognitive biases can be disrupted may allow marketers to design more effective strategies that align with consumers' cognitive processes. For marketing managers, particularly in contexts where markets are crowded or competitive, the insights provided by this study offer a basis for the design of advertisements that are capable of capturing attention and engaging consumers more profoundly. Furthermore, for new companies entering competitive markets, the findings present a potential strategy for differentiation through the design of advertisements that overcome cognitive biases and foster more robust engagement.

This thesis is structured as follows. In Chapter 2, I provide a comprehensive literature review covering key concepts, including functional fixedness, System 1 and System 2 thinking, the relevance of social media advertisements and consumers engagement with advertisements. In Chapter 3, I outline the methodology, detailing the experimental design, the variables manipulated, and how data is collected through a survey. I also discuss the measures used to assess engagement and decision-making in this research. In Chapter 4, I analyze the survey data, how the manipulated variables performed and conduct the mediation model. In Chapter 5, I discuss the results and their implications for future research for both academics and marketing practitioners as well as limitations. Finally, in chapter 6, I conclude the thesis by summarizing the findings and contributions of the research.

2. Literature Review

2.1 Functional Fixedness as a Cognitive Bias

To better understand how advertisers can break through cognitive barriers and engage consumers more deeply, it is essential to explore the concept of functional fixedness. Functional fixedness is a cognitive bias characterised by a tendency to perceive objects as having specific, predetermined functions (Duncker, 1945; Munoz-Rubke et al., 2018). In 1945, Karl Duncker introduced the concept of functional fixedness as a significant cognitive bias that impairs an individual's capacity to perceive alternative uses for objects beyond their conventional purposes. Duncker's research demonstrated that this bias plays a pivotal role in impeding problem-solving processes (Duncker, 1945). This limitation in cognitive flexibility arises when individuals are constrained by their habitual associations with an object's typical function, which hinders their ability to recognize or apply those objects in novel and creative ways during problem-solving tasks (Camarda et al., 2018). In a study by McCaffrey on functional fixedness, the concept is defined as the tendency to disregard

four essential object characteristics 3 parts, material, shape and size 3 due to their commonly associated functions (McCaffrey, 2012).

The most well-known demonstration of functional fixedness is the candle problem (Duncker, 1945). In this experiment by Duncker (1945), participants are provided with a candle, a box of matches, and thumbtacks, with the objective of affixing the candle to the wall in a manner that prevents the wax from dripping onto the floor. The solution requires an acknowledgement that the box, which is typically regarded as a receptacle for the matches, can also serve as a candleholder when affixed to the wall with thumbtacks. The experiment demonstrates how participants' initial inability to reconsider the function of the box, due to functional fixedness, hinders their ability to solve the problem (Duncker, 1945).

Duncker's research demonstrated that this fixedness occurs not only as a result of visual or perceptual associations (for example, viewing the box as part of the set of objects on the table) but also due to previous functional use (Duncker, 1945). If an object has recently been employed for a specific function, individuals are less inclined to consider it for a novel purpose within the same context. This phenomenon of functional fixedness represents a significant obstacle to cognitive flexibility, which is a crucial component of problem-solving in unfamiliar or ambiguous contexts (S. M. Smith & Blankenship, 1991). Further research has shown that functional fixedness is increased by pictorial examples in problem-solving tasks, as these tend to emphasise the object's conventional function, thereby limiting access to alternative use (Chrysikou et al., 2016). Similarly, in design contexts, exposure to example solutions has been found to induce fixation, particularly when these examples are visually represented (Purcell & Gero, 1996).

This bias is pervasive and has been observed across a range of cultural contexts and age groups. For example, German and Barrett (2005) conducted a study on functional fixedness in the Shuar, a non-industrial society in the Ecuadorian Amazon that relies on hunting, horticulture, and a limited set of low-tech, multi-purpose tools like machetes and fishhooks. Their research found that, despite minimal exposure to specialized tools, Shuar adolescents showed pronounced functional fixedness, struggling to identify alternative uses for objects when their intrinsic function was emphasized. German and Barrett (2005) argue that these findings challenge the assumption that technologically sparse cultures, with their reliance on resource improvisation, exhibit greater cognitive flexibility. Their results indicate that functional fixedness is a pervasive cognitive bias embedded in human semantic memory across cultural and technological contexts (German & Barrett, 2005). A different

study observed that functional fixedness emerges in early childhood, manifesting as early as age five, as demonstrated by Clegg and Legare (2016). Their study employed a problem-solving task to show that children were less likely to complete the task when an object's typical function was primed, indicating a fixed representation of the object's use. Clegg and Legare (2016) found that when objects were presented in a pre-utilized form (i.e., used in a familiar manner prior to the task), children exhibited a reduced tendency to view the objects flexibly and encountered difficulties repurposing them for the task at hand. These findings suggest that functional fixedness is present in early childhood, challenging the assumption that younger children may be immune to this cognitive bias (Clegg & Legare, 2016). While functional fixedness contributes to efficiency by allowing individuals to quickly recognize and utilize objects based on their most common uses, it can also limit creativity and problem-solving by restricting alternative perspectives (Munoz-Rubke et al., 2018). Understanding how to break this cognitive bias is essential for encouraging innovative thinking. In the following section, I will explore strategies to overcome it.

In order to overcome functional fixedness, different approaches can be employed. A first one uses a period of incubation, a delay before reattempting the task, individuals are more likely to overcome these fixed associations and recall alternative solutions. This suggests that incubation allows the weakening of these mental blocks, thus improving cognitive processes related to memory retrieval and problem-solving (S. M. Smith & Blankenship, 1991). Jansson and Smith (1991) proposed another key method which is to deliberately avoid exposure to examples or solutions prior to attempting to solve a problem. According to their study, this strategy prevents individuals from fixating on specific features or elements of existing designs. Jansson and Smith (1991) further emphasized that introducing new constraints or reframing the problem can redirect attention away from fixed ideas, thereby encouraging exploration of alternative possibilities. These approaches aim to reduce the tendency of designers to replicate known designs and instead foster innovative thinking by encouraging a more flexible, exploratory mindset (Jansson & Smith, 1991). Diamond (2013) proposed an alternative approach to overcoming functional fixedness by utilizing executive functions (EFs), which are top-down mental processes necessary when automatic or instinctive responses prove ineffective. According to Diamond, cognitive flexibility4a core EF4enables individuals to think creatively, consider alternative perspectives, and adapt to new rules or circumstances. This flexibility is crucial for solving problems innovatively, such as identifying unconventional uses for objects to overcome functional fixedness. Diamond (2013) also

highlighted the importance of inhibitory control, another key EF, in resisting automatic responses and fixed ways of thinking, allowing individuals to focus on less obvious solutions. Additionally, working memory plays a pivotal role by holding and manipulating information, supporting both cognitive flexibility and inhibitory control, and enabling exploration of multiple options while suppressing irrelevant habitual responses. Together, these executive functions promote thoughtful and deliberate problem-solving, contrasting with automatic, habitual behaviors (Diamond, 2013). McCaffrey (2012) introduced the Generic-Parts Technique (GPT) as an effective method for overcoming functional fixedness and encouraging deeper cognitive processing. This structured approach prompts individuals to engage in detailed, analytical thinking by systematically breaking down objects into their most basic components. According to McCaffrey, the GPT involves asking two critical questions for each component of an object: <Can this be decomposed further?= and <Does this description imply a use?= These questions guide participants to continually deconstruct objects into function-free elements, thereby removing preconceived constraints. The study demonstrated the effectiveness of this approach, as participants trained in GPT successfully solved 67% more problems than those who were not, highlighting the value of deliberate, deeper thinking in overcoming functional fixedness and enhancing creative problem-solving (McCaffrey, 2012).

To establish a connection between functional fixedness and the advertising industry, it is most appropriate to rely on research into advertising creativity, as I believe this is closely aligned with the definition of functional fixedness. Advertising creativity can be understood as the ability to imagine and develop unique selling propositions (USPs) by breaking away from conventional approaches and presenting ideas or products in novel and innovative ways. Further, it involves "dreaming up new ways to present selling propositions" and plays a key role in generating, identifying and translating USPs into forms that stand out and communicate originality (Zinkhan, 1993, p. 1). Previous research has examined five potential factors that contribute to the divergence achieved in advertising, namely: originality, flexibility, elaboration, synthesis, and artistic value (R. E. Smith et al., 2007, 2008; R. E. Smith & Yang, 2004). Advertisers employ various techniques to challenge audience perceptions and stimulate new ways of thinking about familiar issues. This defamiliarisation process breaks through habitual patterns of perception, scepticism and boredom, and often requires a departure from conventional thinking and the use of imaginative strategies to attract attention and make an impact in advertising campaigns (Scott, 1994). Breaking functional fixedness in advertisements parallels the use of unconventional visual metaphors. By presenting

coffee in unexpected contexts, such as alternative uses, advertisements can create the cognitive challenge and novelty that enhances engagement and appreciation, similar to the effects of fusions in visual metaphor studies (van Mulken et al., 2014). Spreer (2021) highlights the significant role of functional fixedness in e-commerce, particularly in shaping consumer decision-making. Online shoppers often fail to recognize innovative or alternative product features unless these elements are explicitly emphasized in product descriptions or visuals. Spreer further explains that functional fixedness can be strategically leveraged to create a perceived 8need9 for products. By presenting items as essential for specific tasks that consumers may not have previously considered, companies can stimulate demand for specialized or niche products. This strategy is especially effective when consumers are unaware of alternative methods for achieving the same goals (Spreer, 2021). Drawing on the literature, breaking functional fixedness could be a promising approach for creating more engaging and innovative advertising messages.

2.2 System 1 and System 2 Thinking in Decision-Making

Overcoming functional fixedness involves deliberate, reflective thought processes, which aligns closely with dual-process theories of decision-making. These theories distinguish between automatic, intuitive System 1 thinking and effortful, analytical System 2 thinking, offering a framework for understanding how individuals approach problem-solving and decision-making (Stanovich & West, 2000). The process of decision-making is informed by two distinct cognitive styles, which are collectively referred to as System 1 or System 2 thinking (Stanovich, 1999).

The models of System 1 and System 2 thinking have been extensively investigated by numerous psychologists, including Daniel Kahneman, Jonathan St. B. T. Evans and Keith E. Stanovich. System 1 thinking is defined as an automatic, fast, intuitive, and habitual process that often occurs without conscious effort or deliberate decision-making (J. St. B. T. Evans & Stanovich, 2013). Such thinking is frequently based on emotional responses. Examples of System 1 in action presented by Kahneman include completing common phrases, exhibiting disgusted facial reactions to horrifying images, and driving on empty roads. Kahneman suggests that System 1 decisions are made automatically and rely on survival instincts to perceive the world and react in a timely manner. Fear of spiders, for example, is an instinctive response. The retrieval of such memories occurs spontaneously and without conscious intention or effort (Kahneman, 2011).

In contrast, System 2 is characterised by a slower, more deliberate processing speed and a greater demand for cognitive effort (Kahneman, 2011). Individuals tend to devote greater attention to tasks

that are tedious or complex, which requires the utilisation of System 2. Further, the act of thinking with System 2 is often associated with the notion of having a choice and the ability to concentrate, as System 1 is often perceived to be incapable of effectively handling such tasks (Kahneman, 2011). System 2 monitors System 1 thinking and has the potential to identify and adapt inappropriate responses to correct actions (Soll et al., 2015). The system is responsible for reflective reasoning, problem-solving, and deep analytical thought that required working memory (J. St. B. T. Evans & Stanovich, 2013). Although System 2 is more reliable for making well-considered decisions, it is also more energy-consuming and can be mentally taxing (Kahneman, 2011). As an example given by Kahneman, solving a complex mathematical problem or completing a tax return typically requires the use of System 2. Our active attention leads to a depletion of energy, which in turn limits our capacity to engage with a different, complex task simultaneously. This can result in individuals developing tunnel vision and becoming blind to alternative perspectives (Kahneman, 2011).

The two systems are in a state of constant interaction (Frankish, 2010). Research from Kahneman (2011) and Stanovich (1999) shows that typically, System 2 operates in a low-effort mode, passively accepting the suggestions from System 1. In circumstances where the context is familiar and predictable, System 1 typically produces accurate and appropriate responses. However, their research shows, when System 1 encounters something unexpected or challenging (such as a complex mathematical problem or a surprising event), it "calls upon" System 2 to engage more actively. In such instances, System 2 is activated to evaluate and address the situation with greater thoroughness and conscious thought (Kahneman, 2011; Stanovich, 1999). Kahneman further shows that this division of labour between the two systems is generally highly efficient. He states that System 1 handles the majority of routine decisions rapidly and effectively, while System 2 intervenes when more in-depth analysis is necessary. However, due to the fact that System 1 relies on heuristics, it is susceptible to specific biases and systematic errors (Kahneman, 2011). When these biases occur, System 2 is frequently required to rectify them, thereby ensuring that the final decisions are more considered and accurate (Kahneman, 2011). But how can we assure to use System 2 when needed to avoid biased thinking and decision-making?

There are several debiasing strategies that can be deployed to debias oneself and to transition from System 1 to System 2 thinking. One effective approach is to modify the environment, for example through the use of prompts or nudges that encourage individuals to engage more deeply with the

content they encounter. By prompting users to pause, reflect and assess their decisions, these interventions can encourage the use of System 2, leading to more considered responses (Soll et al., 2015). This could be a valuable approach in the context of advertising, since the creation of new ideas often involves variations on a theme. Such approaches may lack novelty and may be rooted in a tendency towards fixed thinking (S. M. Smith, 2003).

Furthermore, reducing distractions and fatigue can also help to engage System 2 (Soll et al., 2015). It is not uncommon for individuals to become distracted while on social media. For instance, in 2023, 28% of respondents in Germany between the ages of 14 and 69 reported frequently using the internet while watching television. 15% of respondents stated that they rarely used the internet while watching television, while 17% indicated that they occasionally multitasked between both activities (Seven.One Media GmbH, 2023). In the context of short attention spans and advertising, visuals are essential for maintaining audience interest and enhancing memory, positively impacting consumer interest and brand image. Further, visual elements like pictures, symbols, and storytelling can increase consumer engagement and memorability (Rodinova et al., 2023). The use of social media advertisements on highly interactive platforms has the unintentional consequence of reducing attention and memory for advertisements due to the cognitive absorption of the primary activity. However, the use of highly vivid advertisements can counteract this effect by enhancing sensorial appeal and message richness, thereby improving cognitive engagement (Sreejesh et al., 2020). Using visual imagery reduces cognitive load and conveys information quickly, engaging customers emotionally and improving brand perception (Günay, 2021). The creative use of visuals has been shown to increase pleasure, arousal, and attention allocation. For instance, in food ads on Instagram, high visual complexity elicited more favourable responses, such as pleasure and arousal, than low complexity (Kusumasondjaja & Tjiptono, 2019). Another example is the incorporation of dynamic product presentations as those enhances attention allocation and deepens information processing, thereby improving visual fluency and facilitating the communication of multiple brand meanings (Zhang et al., 2020). In addition, incorporating unexpected elements into advertisements can enhance their effectiveness in capturing attention, create excitement and foster a desire among audiences to follow their story (Rodinova et al., 2023). Further, it is important to balance cognitive effort with the processing costs of advertisements. Visual metaphors of moderate complexity, such as fusions, optimize consumer engagement by demanding a cognitive effort that aligns with the recipient's willingness and ability to process the message (van Mulken et al., 2014). Thus,

encouraging alternative perspectives and providing clear information suggest a shift for consumers from instinctive, quick decisions to more deliberate, considered ones (Soll et al., 2015). This shift is crucial in creating lasting engagement and improving decision-making accuracy. This is supported by a study by Ipsos provides insight into how advertising can influence consumer decision making by slowing down the typical response time associated with automatic brand preference. In their experiment, participants took longer to decide when exposed to an ad, suggesting that the ad disrupted their System 1 thinking and created a cognitive conflict. This delay suggests the activation of System 2 thinking, where the consumer engages in more effortful consideration of the brand choice before deciding (Venkatraman et al., 2020). This finding highlights the importance of designing ads that challenge automatic responses and instead increase attention encouraging deeper cognitive engagement.

Regarding the advertising elements, most of the attention in both original and familiar advertisements is devoted to the image, here the size of the pictoral element does not make a difference in capturing attention (Pieters & Wedel, 2004). Especially for social media posts, both the title and the image are of primary importance in capturing the attention. Furthermore, introducing originality in advertisements increases attention to the brand element (Pieters et al., 2002). On average, users dedicated over 40 seconds of visual attention to the title, while pictures received around 45 seconds of dwell time. Fixations refer to the moments when a user's gaze is locked onto a specific visual element, indicating focused attention (Mayer et al., 2024).

Dual-process theory with System 1 and System 2 thinking has profound implications for advertising and marketing. Most consumer decisions are shaped by System 1 processes, relying on heuristics like brand recognition, emotional associations, and visual appeal to make quick, automatic judgments. Advertisements that align with System 1, such as those using emotionally resonant storytelling, tend to dominate in fast-paced environments like social media (Spreer, 2021). However, advertising strategies that disrupt these intuitive processes can activate System 2 thinking, prompting more reflective engagement. For example, creative campaigns that disrupt conventional product associations or introduce unexpected elements can shift consumers from automatic heuristic-based thinking to more deliberate, reflective processing, thereby influencing consumer judgment and decision-making (Samson & Voyer, 2012). This interplay between the systems highlights the need for a balance between intuitive and reflective advertising strategies to optimize engagement and impact.

In contexts such as social media, where distractions are common, designing advertisements that capture attention and provide brief but meaningful incentives for deeper cognitive engagement might increase the likelihood of System 2 activation. Thus, I propose the following hypothesis:

> **H1**: Breaking functional fixedness in advertisements positively influences cognitive engagement.

2.3 The Relevance of Social Media Advertising

This dynamic interplay between System 1 and System 2 thinking also plays a crucial role in how users engage with content on social media platforms. While highly noticeable and intrusive advertisements often attract initial attention, they do not necessarily result in higher user engagement or positive interactions. Instead, advertising strategies that achieve a moderate balance in visual influence tend to optimize both user experience and campaign effectiveness (Jankowski et al., 2016). Thus, advertisements must not only capture initial attention but also sustain engagement by resonating emotionally and maintaining contextual relevance (Santoso et al., 2022). Social media encompasses a wide range of internet-based platforms that allow users to interact, collaborate and share content. Unlike traditional one-way communication channels, social media enables users to create their own content and engage directly with brands and other users (*Social Media*, n.d.). This dynamic environment encourages both user-generated content (UGC) and brand-generated content (BGC), supporting communication, relationship building, and collective information sharing. Further, the main types of social media platforms include social networks, media-sharing sites, rating platforms, blogs, online communities, and microblogging services, each offering unique ways for users to connect and interact (Meffert et al., 2019).

An advertisement is a paid or donated announcement or persuasive message placed in mass media by an identifiable individual, company or organisation. It aims to inform or influence an audience by presenting a product, service or idea (Marketing Accountability Standards Board, n.d.). Social media advertising involves creating ad content within social networks that resonates with users' personal motivations, such as topics of interest or social identity alignment (Geng et al., 2021). Effective social media advertising engages users by offering value that feels relevant to their personal interests, while avoiding intrusiveness and respecting privacy concerns to foster positive attitudes (Taylor et al., 2011). By integrating paid, owned and earned media strategies, brands can combine display ads, influencer partnerships and user-generated content to extend reach and build trust. This multifaceted approach encourages users to share, comment and engage with brand

content, driving word-of-mouth and fostering stronger brand-consumer relationships (Meffert et al., 2019).

The significance of social media advertising is reflected in the sheer volume of users and engagement metrics. In 2023, the average user spent approximately two hours and 21 minutes daily on social platforms (GWI, 2023). Further, Instagram boasts 2 billion active monthly users, with the average U.S. Instagram user spending 16 minutes a day on the app in 2024. Furthermore, already 86% of organisations have a presence on Instagram and 91% of organisations with a presence on Facebook (Hootsuite, 2024). The increasing importance of social media advertising is also demonstrated by TikTok increasing its ad reach by 22 million users in just three months (Kemp, 2024). In Europe, social media advertising spending reached 23.3 billion euros, with non-video ads (such as static display) accounting for 11.7 billion euros (IAB Europe, 2024b, 2024a). Still, for business accounts, Instagram photo posts have an average engagement rate of 2.69% (Statista, 2024).

2.4 The Effect of Social Media Advertising on Product Recall

Attention and memory are critical components in the effectiveness of social media advertising, particularly as they influence pre-purchase behaviors like awareness and interest (Ahmed, 2017; Pieters et al., 2002; Pieters & Wedel, 2004; Sama, 2019). Social media platforms have become essential tools for product discovery, especially among younger demographics such as Generation Z. Studies indicate that 28% of internet users become aware of new brands or products through social media advertisements, and 87% of Instagram users take action after encountering product information on the platform, including searching for details or making purchases (Facebook IQ, 2019; GWI, 2023). Further, a review of social trends in 2024 indicates that brands who publish engaging content on social media will succeed in attracting attention, engagement, and eventually market share from those who continue to publish the same content (Hootsuite, 2024).

Visual elements play a pivotal role in increasing product recall, especially in an environment characterized by short attention spans. Further, research has demonstrated that visuals, such as pictures, symbols, and storytelling, are essential for maintaining audience interest and enhancing memory, thereby positively impacting consumer interest and brand image (Rodinova et al., 2023). Dynamic product presentations can further enhance attention allocation and deepen information processing, leading to improved visual fluency and more effective communication of multiple product meanings (Zhang et al., 2020). Moreover, plenty of research has demonstrated a correlation

between advertising creativity and increased attention and interest (Pieters et al., 2002; R. E. Smith et al., 2007, 2008; Till & Baack, 2005). Specifically, ad originality has a positive impact on both the level of attention devoted to the ad and the extent to which a brand is stored in memory (Pieters et al., 2002; Rosengren et al., 2020). In detail, creative advertising increases message comprehension, depth of processing and memorable claims (R. E. Smith et al., 2008). Consequently, original ads outperform their competitors and have a longer lifespan than ordinary ads (Pieters et al., 2002). Rich and contextually relevant visuals, combined with originality, contribute to higher engagement and memorability (Rosengren et al., 2020; Yoo & Kim, 2014).

Empirical research highlights several factors that enhance product recall, including the type of ad content, level of processing, and viewer involvement. Leong et al. (1996) demonstrated that ads containing both pictures and words yield significantly better recall compared to words-only ads. Their findings emphasize that ads processed semantically, rather than sensorially, and those that incorporate high levels of meaning perform better. Specifically, ads with high-meaning visuals and repeated exposure resulted in a 52% improvement in brand name recall. Thus, the level of meaning and depth of processing are the most significant contributors to explaining variations in brand recall (Leong et al., 1996). Houston et al. (1987) investigated how discrepant information in ads affects recall. Their study revealed that ads combining semantically discrepant pictures and verbal content4where the picture creates an expectation that is disrupted by the copy4result in superior recall. This effect occurs because discrepant content prompts elaborative cognitive processing, which strengthens associative linkages in memory. Notably, this elaboration spreads throughout the ad, improving recall for both preceding and subsequent content. The research suggests that such ads are particularly effective during a brand's introductory phase when creating consumer awareness is a primary objective (Houston et al., 1987). The relationship between visual attention and recall has also been explored in depth. Simmonds et al. (2020) found that visual attention plays a key role in enhancing recall, particularly among non-users and light users of a brand. Using eye-tracking software, their results showed that greater visual fixations lead to improved memory for the advertised brand among these segments. In contrast, for heavier users, visual attention did not significantly impact recall. These findings highlight the need for advertisers to develop visually engaging content that captures the attention of potential consumers who are less familiar with the brand (Simmonds et al., 2020).

Thus, cognitive engagement, including attention and depth of processing, is closely linked to product recall. Ads that encourage deeper processing by disrupting expectations or presenting content higher levels of meaning foster greater elaboration, which enhances recall (Houston et al., 1987; Leong et al., 1996). J.W. Park and Hastak (1994) found that viewer involvement significantly influences memory-based judgments and recall intensity. Higher involvement at the time of evaluation led to increased search intensity and higher delayed recall compared to lower involvement conditions. This indicates that cognitive engagement plays a mediating role in memory retrieval, as individuals who engage more deeply with content are better able to recall specific product information later (J.-W. Park & Hastak, 1994).

As social media continues to dominate as a channel for consumer-brand interactions, exploring how creative strategies like breaking functional fixedness influence memory and product recall becomes increasingly important. This leads to the next hypotheses:

H2: Cognitive engagement positively influences product recall.

H3: Cognitive engagement mediates the relationship between breaking functional fixedness and product recall.

2.5 The Effect of Social Media Advertising on Purchase Intention

Social media advertising has emerged as a powerful tool to influence consumer satisfaction and thus purchase intentions by leveraging platforms like Facebook and Instagram (Jamil et al., 2022). These platforms provide unique opportunities for advertisers to engage consumers through interactive, creative, and informative advertisements (Lee & Hong, 2016). By utilising on the diverse features of social media, such as likes, shares, comments, and direct messaging, brands can establish stronger connections with their target audiences, fostering reputation and encouraging purchase behaviors (Dehghani & Tumer, 2015).

The effectiveness of social media advertisements lies in their ability to balance emotional and rational elements. Emotional appeals, such as entertainment and storytelling, capture initial consumer attention, while providing relevant and up-to-date product information satisfies consumers9 cognitive needs, ensuring informed and confident purchase decisions (Dehghani & Tumer, 2015). This dual approach ensures that advertisements not only attract attention but also sustain consumer interest, ultimately influencing purchase intentions. Dynamic product presentations, which promote visual fluency, are particularly effective at enhancing purchase intent. These strategies allow advertisers to communicate multiple brand meanings, appealing to

both hedonic and utilitarian consumer needs (Zhang et al., 2020). Furthermore, interactive advertisements that engage users in co-creating brand value and incorporate aestetic and trendy content foster stronger consumer-brand interactions, enhancing perceived ad value and positively impacting purchase intentions (Hussain et al., 2022). This aligns with the concept of breaking functional fixedness on social media for example when presenting lifehacks that provide simple solutions to persistent problems (Weatherford et al., 2021). By incorporating high-quality visuals, entertaining content, and interactive features, brands can stimulate both cognitive and emotional responses, enriching the shopping experience and positively influencing purchase intentions (Hussain et al., 2022; Yoo & Kim, 2014).

Creativity in social media advertising plays a critical role in shaping consumer responses. Research shows that creative advertisements significantly enhance behavioral and purchase intentions while also improving ad recall (Rosengren et al., 2020). This is particularly relevant in competitive markets, where original and unconventional ads outperform standard ones by generating excitement, deepening cognitive engagement, and fostering curiosity about the product (Rosengren et al., 2020).

Lee and Hong (2016) show that the informativeness of social media advertisements also emerges as a key driver of purchase intent. Informative ads provide consumers with the details they need to make optimal purchase decisions, thereby enhancing trust and reducing information asymmetry. Consumers are more likely to engage with ads that address their functional needs while also offering creative, hedonic value (Lee & Hong, 2016). In this context, ad informativeness and persuasiveness can significantly lead to higher consumer brand awareness and subsequently purchase intentions (Tan et al., 2021).

Research from Nasir et al. (2021) indicates that segmenting audiences based on responsiveness enhances social media ad effectiveness. Consumers9 purchase intentions are influenced by factors such as perceived relevance, informativeness, and impulse buying tendency, with the "dispassionate" segment particularly driven by informativeness, ease of persuasion, and social network proneness (Nasir et al., 2021). This highlights the need for tailored advertising strategies, as factors influencing purchase intentions vary across groups, requiring unique approaches to capture attention and align with consumer preferences.

In summary, the effectiveness of social media advertising in driving purchase intentions lies in its ability to combine creativity, informativeness, and interactivity. By leveraging these elements and

tailoring content to meet the preferences of diverse consumer segments, advertisers can create compelling campaigns that not only foster deeper cognitive engagement but also foster meaningful consumer-brand relationships and encourage purchase behaviors (Dehghani & Tumer, 2015; Nasir et al., 2021). By challenging conventional thinking, strategies like breaking functional fixedness offer unique opportunities to engage consumers and shape decision-making. This leads to the hypotheses:

H4: Product recall positively influences purchase intentions.

H5: Product recall mediates the relationship between cognitive engagement and purchase intentions.

H6: Cognitive engagement and product recall sequentially mediate the relationship between breaking functional fixedness and purchase intentions.

To empirically test the hypotheses derived from the literature, a serial mediation model will be employed (see Figure 1). The model examines the relationship between breaking functional fixedness in advertisements (X) and purchase intentions (Y), mediated sequentially by cognitive engagement (M¡) and product recall (M¢).

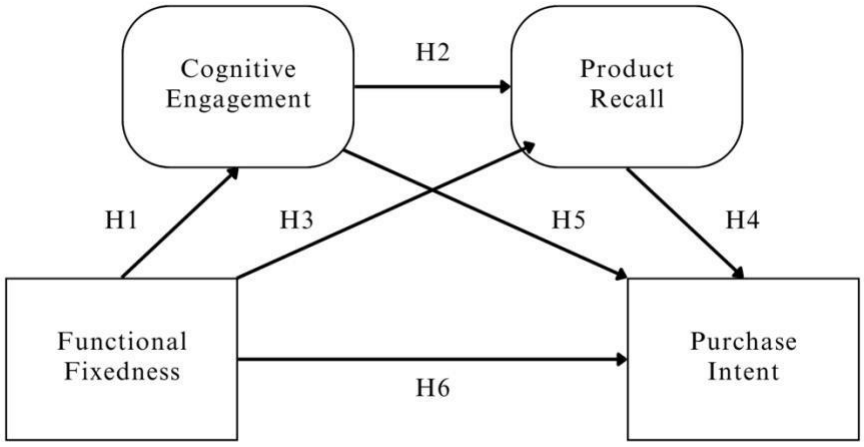

Figure 1: Conceptual Model

3. Methodology

3.1 Participants

The objective was to recruit at least 130 participants for this experimental between-group study, with a target of 65 participants per group (Durlak, 2009). Participants were selected based on

completing a survey conducted through the Qualtrics platform and passing an attention check. Participants were promptly reached via the sharing of content on social media platforms or other communication platforms. Furthermore, the high reach and possibility of addressing an international target group through the incorporation of translations into different languages represent additional advantages. In addition, the automatic collection of data for analysis and evaluation is a further benefit (Meffert et al., 2019). J. R. Evans and Mathur (2018) show that the use of an online survey offers significant value to this study in terms of simplifying data entry and analysis, ensuring immediate and accurate data collection, and minimizing administrative effort. Further, the option to include a variety of question types enables the comprehensive measurement of variables. This method effectively captures both numerical data and perceptions, which are crucial for assessing participant engagement with advertisements (J. R. Evans & Mathur, 2018). However, there are also potential disadvantages associated with online surveys. These include response rates that are often low, as well as insufficient information about the population as a whole, which may limit representativeness. In addition, there is a lack of control over the completion situation and response bias due to the anonymity of respondents (J. R. Evans & Mathur, 2018; Meffert et al., 2019).

Recruitment was conducted through various channels, including sharing the link with friends, family, and colleagues via WhatsApp, posting the link on social media, and posting the link in Facebook groups dedicated to gathering respondents for surveys. The survey was also distributed via the survey platforms Surveycircle.com and Surveyswap.io. As an incentive to complete the survey, all participants who provided their email address at the end of the survey were entered into a prize draw for a €25 voucher. To increase the number of participants, the survey was also translated into German so that it was available in both English and German, given the expectation of a high proportion of German participants. The demographic variables recorded included age, gender, and educational background, though no strict inclusion or exclusion criteria beyond coffee consumption were applied.

A total of 534 respondents participated in the survey, of which 369 passed the attention check. Respondents who were identified as bots or provided incomplete or irrelevant answers were excluded from the analysis. The final sample for the SPSS analysis consisted of 147 respondents, with 75 assigned to the experimental group and 73 to the control group. Of the total of 147 respondents, 33.3% identified as male (n = 49), and 66.7% identified as female (n = 98) (Table 7).

The mean age of the sample was 32.13 years (*SD* = 10.42), with ages ranging from 16 to 78 years (Table 11). The majority of participants were students (46.9%, *n* = 69), followed by those employed full-time (32%, *n* = 47) (Table 8). Annual income distributions showed that 42.9% earned less than €20,000, while 21.8% earned between €20,000 and €39,999 (Table 9). The majority of participants were from Germany (83.7%, *n* = 123), with smaller representations from other countries such as the United Kingdom (4.8%) and the Netherlands (3.4%) (Table 10).

3.2 Materials

The experimental design incorporated two distinct advertisement conditions, each crafted to engage cognitive processing in different ways based on the dual-process theory (Frederick, 2005; Kahneman, 2011). I chose coffee as the product category for the advertisements for its multiple usage options (e.g. Andreae, 2023) and previous research using it, showing its ease of applicability to research settings. For instance, a study has utilized coffee to examine cognitive load in social media advertising, highlighting how product involvement, particularly with coffee, can influence engagement under varying cognitive demands (Pittman & Haley, 2023). Further, Park and Namkung (2022) explore Instagram marketing in the coffee industry, demonstrating that visual and interactive advertising strategies effectively enhance consumer engagement and brand perception. The choice of coffee in this study thus aligns with these established findings, making it an suitable product to examine the effects of breaking functional fixedness on cognitive engagement and consumer decision-making. The advertisements were crafted using the DALL-E GPT from ChatGPT, ensuring visual consistency and control over design elements to effectively test the research questions (see Appendix 1). The product in the experimental condition were presented depicting motion (even though they were static pictures, as in the control condition), in line with research showing that dynamic product presentation increases attention and purchase intent (Zhang et al., 2020). Research on stimulus modality has shown that pictorial stimuli often reinforce the usual functions of objects, leading to functional fixation (Chrysikou et al., 2016). By introducing dynamic and unconventional visual elements in advertisements, this study aims to disrupt such cognitive biases and to encourage more creative engagement with the products presented. The two advertising conditions were the following: Participants in the experimental group were shown an ad showing coffee as a beverage and an unconventional use, in this case a gardening fertiliser. This design aimed to break the functional fixation by encouraging participants to think beyond the typical use of coffee as a beverage. In the control condition, participants were also shown an

advertisement displaying coffee as a beverage along with a different secondary but familiar use, in this case an ingredient in baking tiramisu. This approach ensured that the established associations with coffee as a product for consumption were maintained, thereby preserving functional fixedness. I conducted a pre-test to evaluate the effectiveness of advertisements in manipulating functional fixedness and aligning with the study9s conceptual goals. Specifically, the pre-test assessed whether the 8broken functional fixedness9 advertisements led participants to perceive unconventional uses of coffee as unusual and appealing, while the 8maintained functional fixedness9 advertisements reinforced conventional uses (see Appendix 2). 15 Fifteen participants were recruited via personal networks and completed an online survey on Qualtrics (Table 3, Table 4). The survey included a check whether the manipulation worked and product valuation measures (R. E. Smith et al., 2007) and assessed emotional responses using the Positive and Negative Affect Schedule (Watson et al., 1988). Participants viewed the advertisements in randomized order, rated statements about the ads (e.g., <I found the uses of coffee in this ad to be expected=) on a 7-point Likert scale, and completed demographic questions. PANAS ratings captured emotional responses such as <alert,= <excited,= and <enthusiastic.=

Statistical analyses in excel included paired t-tests to compare emotional responses and manipulation check ratings across conditions (see Appendix 3). The experimental condition elicited significantly higher ratings for <bringing unusual items together= ($p = 0.002$) and <moving from one subject to another= ($p = 0.001$), validating its conceptual purpose. The control condition scored higher on Expectancy and Familiarity, confirming its role as a control for breaking functional fixedness (Table 6). PANAS results showed no significant differences on most dimensions, except for <Enthusiastic= ($p = 0.036$), <Alert= ($p = 0.027$), and <Active= ($p = 0.022$) in the broken fixedness condition, in line with expectations for the experimental ads in these conditions, as overcoming fixedness tends to render thoughts more creative and attention-grabbing (Diamond, 2013; Jansson & Smith, 1991). Averages favoured the pair motion-depiction experimental and no-motion-depiction control condition (see Table 5).

These results demonstrated the effectiveness of the advertisements, leading to the selection of a depiction of a motion for the experimental condition and no depiction of a motion for the control condition for the main study. Emotional responses, while noted, were considered secondary to the manipulation9s primary goals.

3.3 Procedure & Design

Participants accessed the study link through various social media channels and messaging apps, directing them to Qualtrics, the survey platform hosting the experiment. After agreeing to informed consent, participants completed an initial question assessing their involvement with coffee products. This question, presented before exposure to any advertisement, gauged their general interest level in coffee. It was measured with a single-item question: <How interested are you in coffee products?= Participants responded on a 7-point Likert scale (1 = <not at all interested= to 7 = <very interested=) (adapted from (Zaichkowsky, 1994). This measure aimed to capture participants9 baseline engagement with coffee, in line with social media algorithms that prioritize content based on predicted relevance and user engagement (Macready, 2024).

Following the involvement question, participants were automatically assigned to one of two advertisement conditions. The experimental group viewed an advertisement designed to break functional fixedness and Group 2, the control group, saw an advertisement that maintained functional fixedness. This random assignment process, managed by Qualtrics, ensured an unbiased distribution between the experimental and control conditions.

Participants were instructed to view the advertisement carefully, with a prompt encouraging them to examine each element closely before moving forward. This instruction aimed to foster attention and cognitive engagement, encouraging a reflective, deeper processing mode (Samson & Voyer, 2012). After viewing the ad, participants completed a series of measures assessing attention, engagement, and product recall and purchase intention, while Qualtrics recorded the time each participant spent on the advertisement page as an additional indicator of cognitive processing depth. Upon survey completion, participants were informed that they would be entered into a raffle for a chance to win a €25 Amazon gift card if they provided their email address in a different linked survey to ensure anonymity. They also received a message of appreciation for their collaboration and were provided with the researcher9s contact information in case they wished to learn more about the study. For a comprehensive overview of the questionnaire content, please refer to Appendix 4.

3.4 Measurements

The following section outlines the specific measurements used to assess the key constructs of in the study mainly focusing on consumer processing and response towards the advertisment (Maclnnis & Jaworski, 1989; R. E. Smith et al., 2007). The measurement scales utilized in this

study were adapted from established research on advertising creativity, which provides the closest conceptual framework to the notion of breaking functional fixedness. Studies on advertising creativity often focus on assessing the effects of novel and unexpected presentations of products on consumer attention, engagement, and cognitive processing (R. E. Smith et al., 2007; R. E. Smith & Yang, 2004), which are closely aligned with the goals of this study. By drawing on these validated scales, this study leverages tools designed to measure the effectiveness of unconventional advertising techniques, ensuring relevance and reliability in assessing the impact of functional fixedness-breaking advertisements on cognitive and behavioral responses.

3.4.1 Independent Variable

The independent variable is the manipulation of functional fixedness, operationalized as two distinct advertising conditions: functional fixedness maintained (control condition) and functional fixedness broken (experimental condition). This manipulation aims to test the impact of breaking functional fixedness on subsequent cognitive engagement, attention, recall, product valuation, and purchase intention, allowing for a comparative analysis of the cognitive effects between these two conditions.

3.4.2 Manipulation Check

A manipulation check is conducted to ensure the intended difference between the experimental and control condition advertisements. Participants rated three self-developed items4<I found the uses of coffee in this ad expected,= <The ad showed coffee in ways I am familiar with,= and <The presentation of coffee in the ad was typical=4on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). These items assessed whether the manipulated ads successfully deviated from conventional coffee presentations.

3.4.3 Mediators

Cognitive Engagement: Cognitive engagement is measured drawing on validated scales derived from Maclnnis and Jaworski (1989) and R. E. Smith et al. (2007) that to measure participants9 cognitive efforts to comprehend and interpret the advertisement. The Scale consists of Processing and Attention Items. Processing is measured using a 7-point Likert scale (1 = <Strongly Disagree= to 7 = <Strongly Agree=) through the items like <I really wanted to understand the ad= and <I was able to imagine using the product in the advertisement.= The attention was measured using a 7-point Likert scale (1 = <Strongly Disagree= to 7 = <Strongly Agree=) through statements such as <I

examined the main elements of the ad very carefully= and <The ad demanded my attention.= (R. E. Smith et al., 2008). These items were selected to evaluate the extent to which the advertisements captured participants' attention and fostered an active engagement with the ad content. This scale relies on self-reporting, so that attentive readers indicate using reflective decision-making torwards the advertisment. These scales were invented with the goal to assess whether greater motivation to processing, the greater the processing activity towards analyzing the ad (Maclnnis & Jaworski, 1989). This is in line with System 2 thinking requiring working memory and being correlated with cognitive ability (J. St. B. T. Evans & Stanovich, 2013).

Time spent on advertisement: In this study, the measurement of time spent on an advertisement is used as an indicator of System 2 thinking. This approach is consistent with research on the Cognitive Reflection Test (CRT), initially introduced by Frederick, which is designed to assess cognitive ability by distinguishing between intuitive and deliberate thinking processes. System 1 thinking, as demonstrated in the CRT, often results in quick, heuristic-driven responses that are not entirely accurate. In contrast, System 2 thinking is more effortful and deliberate, and typically results in more accurate decisions (Frederick, 2005). However, it takes longer to process. Several studies on CRT and similar dual-process models confirm that System 2 thinking is associated with longer response times, as participants reflect on and override their initial intuitive judgments (Böckenholt, 2012; Johnson et al., 2016; Otero & Alonso, 2023; Szaszi et al., 2017; Thompson et al., 2011). Therefore, measuring time spent on an advertisement can serve as an effective proxy for the level of cognitive processing involved, specifically indicating whether participants engage in deeper, more reflective thought processes. This is used as an alternative to cognitive engagement in the model, as a robustness check.

Product Recall: Product recall is examined to understand participants9 memory of the advertised product. The recall aspect utilized both a closed and an open-ended question, which were adapted from Till & Baack (2005), such as <I remember the advertised product in the ad= and <How was the product advertised?= These questions aim to measure the degree to which the product left a lasting impression on the participants.

3.4.4 Dependent Variable

Finally, purchase intention is measured using 7-point Likert scale (1 = <Improbable= to 7 = <Probable=) adapted from (Yang & Smith, 2009). The items included the statement <If you were about to buy coffee and you had the option to buy the coffee just shown, what is the probability

that you will: Try out the advertised product? Purchase the advertised product? Pay a higher price for this product?= This scale aims to assess participants9 likelihood of acting on their engagement with the ad, providing insight into the potential influence of functional fixedness-breaking advertisements on consumer behavior.

4. Results

4.1 Data Treatment

I analyzed the data collected from the survey using IBM SPSS. This software facilitated the examination of relationships between variables, evaluation of group differences, and testing of the study's research questions through appropriate statistical techniques. Further, I used Hayes9 PROCESS for SPSS (Version 4.2) to run the serial mediation model (Hayes, 2022). To create the scales, I averaged the respective items and assessed internal consistency using Cronbach's alpha, which showed acceptable reliability across constructs. The reliability of the cognitive engagement scale, which measured attention and depth of processing, was assessed using Cronbach9s α and a pearson correlation analysis (Table 22). The scale demonstrated good internal consistency, with α = .82 for the four items (Table 21). Similarly, the purchase intentions scale showed excellent reliability, with α = .92 for the three items (Table 23). These procedures ensured reliable and valid measures aligned with the theoretical framework.

4.2 Descriptive Statistics

The experimental group consisted of 75 participants and the control group consisted of 72 participants (Table 12). Participants' interest in coffee was measured using a 7-point Likert scale (1 = not at all interested, 7 = very interested). The mean coffee interest score for the control group (n = 70) was 4.33 (SD = 1.95), while the mean for the experimental group (n = 75) was 4.64 (SD = 1.94) (Table 12).

An independent samples t-test was conducted to assess whether the groups differed in their interest in coffee. The results indicated no statistically significant difference between the two groups, $t(143) = -0.96$, $p = .338$, with Levene9s test confirming equal variances ($F = 0.007$, $p = .934$). The mean difference was -0.31, with a 95% confidence interval of [-0.95, 0.33]. The effect size (Cohen9s d) was small and negligible ($d = -0.16$) (Table 13, Table 14).

The manipulation check assessed whether participants perceived differences in the presentation of coffee in the advertisements. The three manipulation check items demonstrated acceptable internal

consistency (α = .741), confirming the reliability of the scale (Table 15). The mean combined score for the manipulation check was 5.30 (*SD* = 1.10) for the control group and 4.56 (*SD* = 1.46) for the experimental group (Table 17). An independent samples *t*-test showed a statistically significant difference between the two groups, $t(145) = 3.42$, $p < .001$, indicating that participants in the control group perceived the advertisement as more typical compared to the experimental group. Levene9s test for equality of variances was not significant ($F = 2.71$, $p = .102$), confirming the assumption of equal variances (Table 18). The mean difference was 0.73, with a 95% confidence interval of [0.31, 1.15]. The effect size for this difference was substantial (Cohen9s $d = 0.56$) (Table 19). The means and standard deviations of all items can be found in Table 1.

Descriptive Statistics

	N	Mean	Std. Deviation
Interest_in_Coffee	145	4.4897	1.94764
Cognitive_Engagement	147	5.0748	1.23602
Product_Recall	147	5.49	1.478
Purchase_Scale	147	4.0703	1.70915
Valid N (listwise)	145		

Table 1: Descriptive Statistics of all items

The correlation analysis showed positive relationships between each item and is presented in Table 20. Breaking functional fixedness was positively correlated with cognitive engagement ($r = .211$, $p = .010$) and purchase intentions ($r = .190$, $p = .021$), suggesting its potential influence on deeper cognitive processing and behavioral outcomes. Cognitive engagement was strongly linked to product recall ($r = .529$, $p < .001$) and purchase intentions ($r = .682$, $p < .001$). Product Recall also showed a significant positive correlation with purchase intentions ($r = .314$, $p < .001$). Thus, the correlations support the hypothesized serial mediation pathway.

4.3 Hypothesis Testing

To test the hypotheses, I used Hayes' PROCESS macro for SPSS (Version 4.2), which facilitates regression-based path analysis to evaluate direct, indirect, and total effects within mediation models (Hayes, 2022). Model 6 was utilized to evaluate the proposed serial mediation (see Figure 2), whereby cognitive engagement and product recall act as mediators (M¡, M¢) in the relationship between breaking functional fixedness (X) and purchase intentions (Y) (*Introduction to Mediation Models with the PROCESS Macro in SPSS*, 2024).

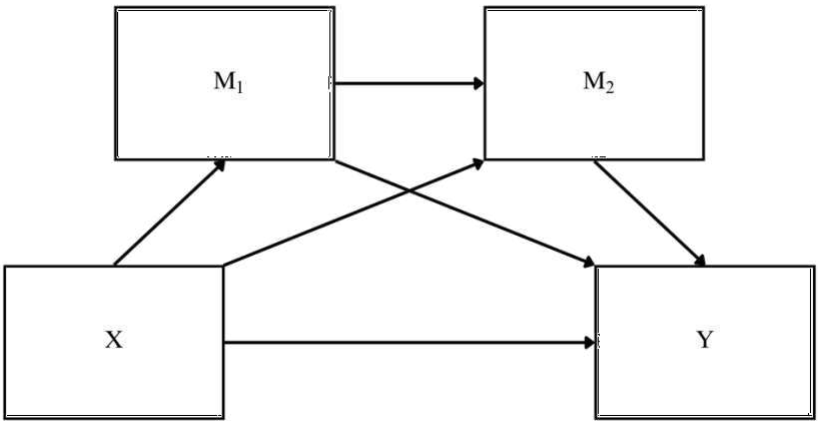

Figure 2: Model 6 of Hayes PROCESS macro for SPSS

To ensure robust estimation of the effects, the analysis employed a bootstrap approach with 5,000 resamples and a 95% confidence interval. The use of bootstrapping is particularly advantageous as it does not rely on the assumption of normality and generates confidence intervals through the repeated resampling of the observed dataset. This makes it a more flexible and reliable approach for mediation testing (Waples, 2024). In this analysis, breaking functional fixedness was treated as the independent variable (coded: experimental group = 1, control group = 0). Cognitive engagement (M1) and product recall (M2) were examined as mediators, while purchase intentions served as the dependent variable (Y). The model structure permits the assessment of both individual mediation paths (indirect effects) and the full sequential mediation pathway.

To test whether breaking functional fixedness positively influences cognitive engagement, a regression analysis was conducted. The results showed a statistically significant effect of breaking functional fixedness on cognitive engagement, with $b = 0.52$, $SE = 0.20$, $t(145) = 2.60$, $p = .01$. The standardized coefficient was $\beta = 0.42$, indicating a medium effect size. The model explained 4.47% of the variance in cognitive engagement, $R^2 = .04$, $F(1, 145) = 6.78$, $p = .01$. H1 is supported, as breaking functional fixedness positively influences cognitive engagement.

To examine the effect of cognitive engagement on product recall, a regression analysis was performed. The findings indicated that cognitive engagement significantly predicted product recall, with $b = 0.63$, $SE = 0.09$, $t(144) = 7.31$, $p < .001$. The standardized coefficient was $\beta = 0.53$, representing a strong positive effect. The model accounted for 28.01% of the variance in product recall, $R^2 = .28$, $F(2, 144) = 28.01$, $p < .001$. H2 is supported, demonstrating that higher levels of cognitive engagement enhance product recall.

To analyze product recall more in detail for each condition, I conducted a content analysis to explore how breaking functional fixedness influenced participants9 recall of product, emotional, and advertising elements in open-ended responses. Chi-square analyses revealed significant results for product elements and advertising elements. However, in each case, participants in the control condition were more likely to recall these elements than those in the manipulation group. Full statistical results and more details on the analysis itself are presented in Appendix 8.

To test the relationship between product recall and purchase intentions, a regression analysis was conducted. The results showed that product recall did not significantly predict purchase intentions ($b = -0.08$, $SE = 0.08$, $t(143) = -0.91$, $p = .37$). The standardized coefficient was $\beta = -0.07$, indicating a negligible effect. The model explained 47.09% of the variance in purchase intentions when cognitive engagement and breaking functional fixedness were included, $R^2 = .47$, $F(3, 143) = 42.42$, $p < .001$. While the direct effect of product recall was not significant, cognitive engagement remained a strong predictor of purchase intentions ($b = 0.98$, $SE = 0.10$, $t(143) = 9.70$, $p < .001$), with a standardized coefficient of $\beta = 0.71$. H4 is not supported, as product recall does not significantly influence purchase intentions.

The indirect effect of breaking functional fixedness on product recall via cognitive engagement was significant (*Effect* = 0.51, *Boot SE* = 0.20, *Boot LLCI* = 0.13, *Boot ULCI* = 0.92). H3 is then supported, indicating that cognitive engagement mediates the relationship between breaking functional fixedness and product recall. The indirect effect of cognitive engagement on purchase intentions through product recall was not significant (*Effect* = -0.0003, *Boot SE* = 0.03, *Boot LLCI* = -0.07, *Boot ULCI* = 0.04). H5 is not supported, as product recall does not mediate the relationship between cognitive engagement and purchase intentions. The full sequential indirect effect was also not significant (*Effect* = -0.03, *Boot SE* = 0.03, *Boot LLCI* = -0.11, *Boot ULCI* = 0.03). H6 is, then, not supported, as the sequential mediation pathway fails to reach statistical significance. For the PROCESS Output, see Appendix 7.

To further investigate the relationships between the variables, I conducted additional analyses using either cognitive engagement or product recall as a single mediator. The results indicate that cognitive engagement fully mediates the relationship between breaking functional fixedness and purchase intentions, with a significant indirect effect. In contrast, when product recall was tested as the sole mediator, it did not yield a significant indirect effect, nor did it explain the relationship.

In this case, the direct effect of breaking functional fixedness on purchase intentions remained significant. Full details of these analyses are provided in Appendix 9.

To test the robustness of the serial mediation model, I conducted an additional analysis using time spent on the Advertisement as an alternative mediator instead of cognitive engagement. This analysis did not yield significant mediation effects, as neither Time Spent nor its pathways significantly predicted purchase intentions. Detailed findings are provided in Appendix 10.

Further, to gain additional insight, I explored including coffee interest as a covariate and separately excluding participants with low coffee interest in additional analyses. These analyses further suggest the central role of cognitive engagement as a significant mediator in the relationship between breaking functional fixedness and purchase intentions, while product recall as a mediator remained insignificant in both cases. In addition, the overall indirect effects were significant when cognitive engagement was included, highlighting its influence on purchase intentions in these additional analyses. Detailed results and interpretations are presented in Appendix 11.

Summary of Hypothesis Testing Results

Hypothesis	Pathway	Result
H1	Breaking Functional Fixedness → Cognitive Engagement	Supported
H2	Cognitive Engagement → Product Recall	Supported
H3	Breaking Functional Fixedness → Cognitive Engagement → Product Recall	Supported
H4	Product Recall → Purchase Intentions	Not Supported
H5	Cognitive Engagement → Product Recall → Purchase Intentions	Not Supported
H6	Breaking Functional Fixedness → Cognitive Engagement → Product Recall → Purchase Intentions	Not Supported

Table 2: Hypothesis Testing Results

5. Discussion

5.1 Research Findings

This study explores the impact of breaking functional fixedness in social media advertisements on consumer decision-making, focusing on cognitive engagement, product recall, and purchase intentions. The findings contribute to understanding how unconventional advertising strategies

shape consumer behavior within the dynamic and fast-paced context of social media. While the results support the positive effects of breaking functional fixedness on cognitive engagement and product recall, they reveal complexities in translating these outcomes into purchase intentions. These nuanced insights underscore the need for further research into the factors mediating these relationships.

First, the results support the hypothesis that breaking functional fixedness significantly increases cognitive engagement, H1. This finding aligns with the dual-process theory, which posits that disrupting intuitive, System 1 thinking can prompt reflective System 2 engagement (Soll et al., 2015). By encouraging participants to think beyond conventional product uses, the advertisements successfully activated cognitive engagement. This outcome reinforces existing outcome reinforces existing research about the advertising creativity postively influencing processing and response measures (R. E. Smith et al., 2007, 2008). Breaking functional fixedness may enhance engagement by increasing the need for cognitive elaboration, as participants process unconventional uses of products. Prior research supports this mechanism, suggesting that ads incorporating unexpected elements or novel presentations can foster greater reflective thinking and attention allocation (Rodinova et al., 2023; Samson & Voyer, 2012). Specifically, visually dynamic advertisements that disrupt expectations and challenge automatic associations have been shown to increase attention and foster deliberate cognitive processing (Zhang et al., 2020). Moreover, visuals that demand moderate cognitive effort, such as metaphors or novel imagery, create a balance that enhances cognitive engagement without overwhelming the viewer (van Mulken et al., 2014).

The positive relationship between cognitive engagement and product recall is also found, supporting H2. Participants who reported higher cognitive engagement demonstrated significantly improved product recall. This result aligns with previous studies indicating that deeper levels of engagement enhance memory by facilitating stronger encoding and retrieval processes (Sreejesh et al., 2020; Venkatraman et al., 2020). Advertising content that prompts reflective processing, particularly through visually engaging and semantically meaningful elements, fosters greater elaboration, which strengthens associative memory pathways (Houston et al., 1987; Leong et al., 1996). The use of both text and images in these advertisements may have further supported memory consolidation, as ads containing high-meaning visuals and semantic content outperform those processed at a purely sensory level (Leong et al., 1996).

The significant mediation effect observed in H3 underscores the critical role of cognitive engagement in linking breaking functional fixedness to product recall. Breaking functional fixedness indirectly improves recall by first increasing cognitive engagement. This finding reinforces the idea that reflective engagement mediates memory retrieval. Disrupting conventional associations or including elements with higher levels of meaning in ads are particularly effective at fostering elaborative processing, leading to stronger recall (Houston et al., 1987). Additionally, higher cognitive involvement has been shown to improve delayed recall, as individuals who process content more deeply are better able to retrieve specific product information later (J.-W. Park & Hastak, 1994). Visuals and storytelling elements, especially those combining originality and high visual complexity, have been shown to elicit greater attention and arousal, ultimately improving recall (Kusumasondjaja & Tjiptono, 2019; Rosengren et al., 2020; Yoo & Kim, 2014). This aligns with findings suggesting that engaging content creates stronger memory associations, particularly among consumers who are less familiar with the advertised brand (Simmonds et al., 2020). These findings highlight the importance of engaging System 2 thinking to encourage more deliberate information processing and align with research suggesting that creative ads generally improve attention and memory through originality and enhanced message comprehension (Pieters et al., 2002; R. E. Smith et al., 2007; Till & Baack, 2005).

Self-reported recall showed a positive relationship with cognitive engagement in both the experimental and control conditions, suggesting that participants who were more engaged with the ad perceived themselves as having better recall of its content. However, content analysis of actual recall revealed a different pattern: product recall was significantly higher in the control group than in the experimental group, suggesting a divergence between perceived and actual recall measures. This discrepancy underscores the fundamental differences between self-reported and actual recall measures. Self-reports are often subjective and influenced by participants' perceptions of their engagement, which can lead to overreporting for example due to social desirability or inflated confidence (Baumeister & Hutton, 1987; Dang et al., 2020). The findings on actual and self-reported recall align with prior literature examining recall dynamics in advertising. Research by Till and Baack (2005) indicates that creative advertisements significantly enhance unaided recall likely due to the deeper cognitive engagement they evoke. However, this advantage diminishes in aided recall tasks, where prompts reduce the cognitive challenge of retrieval (Till & Baack, 2005). In the current study, self-reported recall did not require participants to specify the content of the

advertisement but rather to indicate whether they believed they recalled it. This self-reported recall reflected a positive relationship with cognitive engagement, suggesting that participants perceived themselves as remembering more when they engaged deeply with the ad. However, the content analysis of actual recall, which required participants to demonstrate memory for specific product details, revealed higher recall in the control condition, which did not involve breaking functional fixedness. This difference between self-reported and actual recall may indicate that the cognitive engagement created by breaking functional fixedness is not sufficient to enable detailed product recall.

Further, the results do not support H4, which hypothesizes a direct relationship between product recall and purchase intentions. Although there is a positive correlation between cognitive engagement and product recall, product recall does not significantly predict purchase intentions. This finding challenges prior research that suggests a strong recall leads to a greater intent to purchase (R. E. Smith et al., 2008). A potential explanation could be the lack of alignment between recalled information and participants' purchasing goals, particularly in contexts where cognitive load is high (Sreejesh et al., 2020). Prior studies have demonstrated that product relevance and perceived ad informativeness significantly impact purchase intentions (Alalwan, 2018; Nasir et al., 2021). In the absence of these factors, even high recall may not translate into behavioral outcomes. Ads processed at deeper cognitive levels may only influence purchase intentions when they evoke relevance, personal interest, or emotional resonance (Leong et al., 1996; Zhang et al., 2020). Similarly, hypothesis H5, which proposes that product recall mediates the relationship between cognitive engagement and purchase intentions, is not supported. Although cognitive engagement has a positive effect on product recall, this does not result in higher purchase intentions, indicating a failure of the proposed pathway. This result highlights the complex nature of translating cognitive engagement and memory into behavioural outcomes. Cognitive engagement may only serve as a prerequisite for purchase intentions when combined with motivational or affective factors, such as ad informativeness or perceived value (Dehghani & Tumer, 2015). Finally, the sequential mediation pathway proposed in H6 is also not supported. Breaking functional fixedness does not indirectly influence purchase intentions through cognitive engagement and product recall. While functional fixedness enhances engagement and recall, this engagement does not extend to purchase intentions. This finding holds true even when accounting for coffee interest as a covariate or focusing on participants with higher levels of coffee interest, as the direct effect of breaking

functional fixedness on purchase intentions remained non-significant in these analyses. These findings align partially with existing research. The absence of a significant main effect in this study aligns with prior work suggesting that creative ads do not have an effect on purchase (Till & Baack, 2005). The advertisements may not have been closely aligned with participants' preferences and interests, which is consistent with research showing that purchase intentions increase when advertisements are related to personal preferences (Alalwan, 2018). Additionally, research suggests that consumers' purchase intentions are influenced by factors such as perceived relevance, performance expectancy, informativeness, impulse buying tendency, and social network susceptibility, which may not have been present in this study (Nasir et al., 2021).

In conclusion, these findings suggest that breaking functional fixedness can enhance cognitive engagement but may not necessarily improve recall or translate into stronger purchase intentions. Future research should explore the interplay of cognitive, emotional, and motivational factors in shaping purchase intentions to better understand the mechanisms underlying unconventional advertising strategies.

5.2 Academic Implications

This study contributes to the literature on dual-process theories, advertising creativity, and consumer behavior. By demonstrating that functional fixedness-breaking ads foster increased cognitive engagement, the study suggests that creative interventions can disrupt automatic, System 1 thinking, encouraging more deliberate, System 2 thinking. These findings contribute to the literature on dual-process theories and advertising creativity, highlighting the potential of breaking functional fixedness to promote cognitive engagement (e.g. Samson & Voyer, 2012).

The study also underscores the complexity of translating cognitive engagement into behavioral outcomes. The lack of significant effects on purchase intention suggests that while creative strategies may capture attention, these are likely not to be enough to translate into action. Perhaps pairing them with clear messaging and relevance may drive meaningful consumer actions (R. E. Smith et al., 2008; Till & Baack, 2005). The study also highlights the potential role of consumer predispositions, such as product interest, in shaping the effects of creative advertising manipulations. Although not directly tested, this suggests an area for future research to explore how individual differences influence advertising outcomes.

Lastly, this research contributes to the broader field of consumer behavior by illustrating how creative strategies interact with cognitive biases, such as functional fixedness. These findings

suggest that cognitive engagement strategies may not operate uniformly across all consumers and contexts, highlighting the importance of tailoring interventions to specific audiences and situational factors (Nasir et al., 2021).

5.3 Managerial Implications

This research provides valuable insights for social media advertising strategies. Breaking functional fixedness offers a practical approach to capturing consumer attention and foster cognitive engagment, particularly in digital contexts where attention spans are increasingly limited (Facebook IQ, 2019; Sullivan, 2022). By showcasing products in unconventional ways that challenge fixed mental associations, marketers can increase the engagement with advertisements, an essential step in competitive digital advertising environments.

However, the findings suggest that breaking functional fixedness might need to be paired with clearer messaging to optimize recall and purchase intentions. While novel ads may capture attention and foster cognitive engagement, overly complex or misaligned messages risk the intentions to purchase for core product features. The literature suggests that marketers might wish to address this by incorporating reinforcement techniques, such as taglines, dynamic animations, or clear product visuals, to create cohesive and memorable advertisements that resonate with consumers. For example, a way to incorporate breaking functional fixedness effectively might be showing lifehacks (Weatherford et al., 2021).

The study also suggest that the effectiveness of breaking functional fixedness as a strategy may depend on aligning the approach with audience preferences and expectations to translate engagement into behavioral outcomes. While this study does not directly investigate targeted advertising, social media platforms such as Instagram and FaceBook, which use advanced algorithms to target advertising, could help identify audiences predisposed to product interest, thereby amplifying the effects of breaking the functional fixedness of advertising. For instance, functional fixedness-breaking ads may be particularly effective for engaging niche consumer segments, such as coffee enthusiasts, by leveraging data-driven targeting. While breaking functional fixedness may not directly drive purchase intentions across all audiences, it appears to be an effective strategy for fostering engagement in advertising.

5.4 Limitations and future research

While this study offers valuable insights into the effects of breaking functional fixedness on decision-making in social media advertising, it is not without limitations. Addressing these will help contextualize the findings and inform future research directions.

One of the primary limitations is the relatively small sample size, which may reduce the statistical power of the results and limit their generalizability. Despite significant recruitment efforts4 including personal invitations, social media announcements, and reminders4the sample predominantly consisted of participants from the researcher's network. This convenience sampling approach likely introduced selection biases, as respondents may share similar demographic and cognitive traits or coffee-interest. In addition, the geographical concentration of participants, mostly from Germany, further limits the cultural generalisability of the findings. A larger, more diverse sample encompassing varied cultural backgrounds would enhance external validity and allow for more robust conclusions about the impact of functional fixedness in broader contexts (Brysbaert, 2019; Hofstede, 2001). For example, with a larger, more diverse sample, statistically significant differences in depth of processing may be uncovered, particularly given the promising trends observed in this study.

Another limitation of this study lies in the small sample size of the pre-test (15 individuals were selected) used for the PANAS evaluation. The results showed significant differences in the dimensions of "Enthusiastic," "Alert," and "Active" when comparing the motion depicting experimental condition to the no motion depicting control condition, with superior scores for the experimental condition. While this aligns with the intended effect of breaking functional fixedness4making the advertisements more intriguing and energetic4these results should be interpreted cautiously given the limited sample size. Future research with larger samples is necessary to confirm these findings and explore the broader implications of this approach.

Selection bias may have been increased by the incentive offered to participants - the promise of a draw for a €25 Amazon voucher for completing a set of questionnaires. This type of incentive can influence the composition of the sample and sometimes bias the results. Rather than being genuinely interested, some participants may complete the survey primarily to receive the incentive (Singer & Ye, 2013). Similarly, different levels of motivation and interest among participants raise concerns about non-response bias, as voluntary participation may lead to the under-representation

of specific segments within the target group (Berg, 2005). Consequently, this limitation can affect the generalizability of the findings to the broader population.

Further limitations result from the way in which the data was collected and from the measures used in the questionnaires. The reliance on self-reported measures, particularly for assessing attention and depth of processing as an indicator for system 2 thinking and for product recall, represents a significant limitation. The questions used are prone to biases, including a <consistency motif,= where participants adjust responses to appear logical, and social desirability, where individuals present themselves in a favorable light (Baumeister & Hutton, 1987). These biases may lead to overstated engagement or deliberate thinking. Moreover, the measure of product recall, particularly through open-ended responses, may not have captured pure product recall but rather a mix of ad-specific, emotional, and product-related impressions, potentially impacting the accuracy of the findings. Further, factors such as fatigue or the order of questions can diminish the quality of responses, as participants may provide less thoughtful or inconsistent answers to reduce the cognitive burden of completing the survey, particularly for questions appearing later in the sequence (Egleston et al., 2011). The incorporation of objective measures for the awareness and engagement phase, such as eye-tracking or click-through rates, could facilitate the acquisition of more robust insights into consumer behaviour (Meffert et al., 2019). Future studies should incorporate these tools to obtain more robust and unbiased insights into attention and processing depth.

Further, the study was conducted in a controlled, artificial setting that does not reflect the dynamic and distraction-rich environment of real-world social media, limiting the generalizability of findings. It was thus not assessed whether individuals use social media or to which extent. Real-world platforms utilize advanced algorithms, such as deep learning, to personalize content and shape engagement patterns, making interactions more dynamic and tailored (Alrashidi et al., 2023). This controlled environment also lacked nuanced social recommendation systems, resulting in individuals uninterested in coffee being exposed to the advertisement4an occurrence less likely in real-world scenarios. Incorporating real-time social media platforms into experimental designs could enhance ecological validity by better capturing authentic user behavior. Future research should integrate algorithm-driven personalization to better reflect social media realities and improve ecological validity.

Moreover, the experimental design focused on two specific secondary uses of coffee (tiramisu and fertilizer), which may limit its applicability to other product categories. Future research should explore a broader range of unconventional applications, not only for coffee but also for other products, to better understand their relative efficacy across diverse contexts. Encouraging deep cognitive processing by breaking functional fixedness might also be detrimental for products relying on impulsive purchasing behavior, as deeper engagement could lead consumers to scrutinize products more critically and potentially reject them (see for example Li et al., 2021; Lim & Kim, 2022). Future studies should consider how different product types interact with cognitive engagement strategies to develop more generalizable insights.

The robustness analysis (Appendix 10), which included time spent on advertisement as an alternative mediator, revealed another limitation related to the measurement of System 2 thinking. This approach is based on findings from the Cognitive Reflection Test (CRT), which suggest that System 2 thinking requires more time, as participants reflect on and override their initial intuitive judgments (Böckenholt, 2012; Szaszi et al., 2017; Thompson et al., 2011). However, the use of the CRT as a sole measure risks oversimplifying System 2 engagement, as it may not fully account for other contributing factors such as prior knowledge or contextual influences, potentially leading to inaccurate conclusions about participants9 decision-making processes (Szaszi et al., 2017).

Lastly, this study did not directly measure whether the advertisements effectively broke functional fixedness as a cognitive bias. Instead, it focused on whether attempting to disrupt this bias fosters more deliberate decision-making and deeper consumer engagement by presenting products in novel ways. While functional fixedness contributes to cognitive efficiency by aligning object perception with their most common uses, it may also limit the ability to recognize alternative, potentially intriguing applications of those products. This trade-off highlights a need for further exploration of how balancing efficiency with creativity can impact consumer behavior.

6. Conclusion

This thesis demonstrates that breaking functional fixedness in social media advertisements significantly enhances cognitive engagement and product recall, though these effects do not translate into purchase intentions. These findings contribute to the dual-process theory literature by showcasing how innovative advertising strategies can disrupt intuitive System 1 thinking and engage reflective System 2 processes. The lack of direct effects on purchase intentions suggests that additional factors likely play a role in driving consumer behavior. This study underscores the

potential of unconventional advertising to foster differentiation in competitive markets by encouraging deeper cognitive engagement. The results also highlight the importance of tailoring creative approaches to align with consumer preferences. Despite limitations such as sample representativeness and the artificiality of the experimental setting, the research provides a foundation for exploring how cognitive biases like functional fixedness shape consumer decision-making. Future studies should integrate diverse product categories and real-world settings to further refine these insights and enhance their applicability.

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8. Appendix 1

Prompt for Coffee Portafilter

Create this image in landscape format: The image shows a shot of an espresso portafilter used in a professional espresso machine. Fresh espresso flows from the double spout of the portafilter into a white, thick-walled cup below. The two espresso jets are even and have a strong, golden-brown colour, which indicates a good crema - a sign of high-quality extracted espresso. The background and parts of the espresso machine are blurred, clearly focussing on the coffee spout and the cup. The shiny metal surfaces of the espresso machine slightly reflect the light and reinforce the impression of freshness and professionalism. The grid under the cup catches spilt coffee and is typical of such machines. In the background is a cosy interior, illuminated by soft, natural light coming in through large windows on the left of the picture. Other plants are scattered on the windowsill and in the room and are slightly blurred, which emphasises the depth of the picture. The background elements, such as a comfortable armchair and a bookshelf with more plants, contribute to the warm, cosy atmosphere. The room is decorated in warm, natural colours, with lots of green plants and rich brown tones of the coffee powder and wooden furnishings.

Prompt for Experimental Condition with no motion depiction

Create a picture according to the following description in landscape format. The picture shows a hand holding a portafilter with coffee powder over a pot with a healthy Monstera plant. The portafilter is slightly tilted as if coffee grounds are about to fall into the pot. The pot is filled to the brim with moist, dark brown coffee grounds, which serve as a natural fertiliser for the plant. The Monstera plant itself has large, strong, green leaves with typical deep incisions and holes that give it its distinctive appearance. The leaves look vibrant and healthy and can be seen sharply in the foreground, giving them an impressive presence. A cosy interior stretches out in the background, illuminated by soft, natural light coming in through large windows on the left of the picture. Other plants are scattered on the windowsill and in the room and are slightly blurred, which emphasises the depth of the picture. The background elements, such as a comfortable armchair and a bookshelf with more plants, contribute to the warm, cosy atmosphere. The room is kept in warm, natural colours, with lots of green plants and rich brown tones of the coffee powder and wooden furnishings. The whole scene exudes sustainability and nature-loving care, emphasised by the recycling of the coffee grounds as fertiliser in a harmonious, homely setting.

Prompt for Experimental Condition with motion depiction

Create this image in landscape format: The picture shows a hand holding a portafilter with coffee powder over a pot with a healthy Monstera plant. It is in the motion of lightly tapping the portafilter against the pot, causing coffee crumbs to fall out the top and trickle into the pot. The portafilter is slightly tilted as if coffee grounds are about to fall into the pot. point the portafilter forwards so that you are looking strongly at the top opening of the portafilter and turn the portafilter so that the handle is in the selected area with your hand, i.e. top left in the picture. The pot is filled to the brim with moist, dark brown coffee grounds, which serve as a natural fertiliser for the plant. The Monstera plant itself has large, strong, green leaves with the typical deep incisions and holes that give it its distinctive appearance. The leaves look vibrant and healthy and can be seen sharply in the foreground, giving them an impressive presence. A cosy interior stretches out in the background, illuminated by soft, natural light coming in through large windows on the left of the picture. Other plants are scattered on the windowsill and in the room and are slightly blurred, which emphasises the depth of the picture. The background elements, such as a comfortable armchair and a bookshelf with more plants, contribute to the warm, cosy atmosphere. The room is kept in warm, natural colours, with lots of green plants and rich brown tones of the coffee powder and wooden furnishings. The whole scene exudes sustainability and nature-loving care, emphasised by the recycling of the coffee grounds as fertiliser in a harmonious, homely setting.

Prompt for Control Condition with motion depiction

Now create this image in landscape format: The image shows a close-up of hands pouring coffee from a small silver jug onto two ladyfingers lying side by side on a creamy white plate. The coffee flows in a thin stream and wets the ladyfingers, soaking them. There is no coffee cup in the picture. The background and work surface are in light, neutral colours, which places the ingredients and the preparation process in the foreground. In the background is a cosy interior, illuminated by soft, natural light coming in through large windows on the left of the picture. Other plants are scattered on the windowsill and in the room and are slightly blurred, which emphasises the depth of the picture. The background elements, such as a kitchen, a comfortable armchair and a bookshelf with more plants, contribute to the warm, cosy atmosphere. The room is kept in warm, natural colours, with lots of green plants and rich brown tones in the coffee and wooden furnishings.

Prompt for Control Condition with no motion depiction

Now create this image in landscape format: A minimalist kitchen worktop with a shallow bowl of clear glass containing 2 ladyfingers soaked in coffee. There are only ladyfingers and coffee in the bowl and the coffee soaks into the ladyfingers. Next to the bowl is a small recipe card with the words 8Tiramisu Recipe9 in plain writing. The background and work surface are kept in light, neutral colours, which places the ingredients and the preparation process in the foreground. In the background is a cosy interior, illuminated by soft, natural light coming in through large windows on the left of the picture. Other plants are scattered on the windowsill and in the room and are slightly blurred, which emphasises the depth of the picture. The background elements, such as a kitchen, a comfortable armchair and a bookshelf with more plants, contribute to the warm, cosy atmosphere. The room is kept in warm, natural colours, with lots of green plants and rich brown tones in the coffee and wooden furnishings.

Final Advertisements

Figure 3: Control Condition - no motion depiction

Figure 4: Control Condition - motion depiction

Figure 5: Experimental Condition - no motion depiction

Figure 6: Manipulated Condition - motion depiction

9. Appendix 2

Survey Flow:

Welcome and thank you for considering taking part in this survey on decision making in social media advertising. I, Mona Heseler, am conducting this survey as part of my Master's thesis at the Católica Lisbon School of Business and Economics, under the supervision of Filipa de Almeida. We are researching how people interact with advertising on social media. Your insights will help us better understand how different types of advertising influence consumer behaviour. In this survey you will be shown an advertisement and asked some questions based on your experience. Please take the time to answer honestly. There are no right or wrong answers - we are just interested in your personal reactions. All answers will be kept strictly confidential and anonymous. This means that it will not be possible to link your answers to your identity. The data collected will be used for research purposes only and may be presented in my dissertation or published in academic journals, always in aggregate form, never about any individual response.

We ask that you complete the study at one time, without interruption. You can change your mind and drop out at any point during the study. If you have any questions about this study, please email Mona Heseler (s-mheseler@ucp.pt). By continuing, you are agreeing to participate. Thank you very much!

Please carefully view the following advertisement. Take as much time as you need to review the ad before proceeding.

Each of the 4 different ads is be shown in a randomized order and then afterwards these questions about PANAS and Post-Viewing will be answered for each picture.

Please, in relation to the Advertisement you just saw, indicate to what extent you are feeling… (they appeared in a randomized order).

Survey Items and Response Scale

Item	Very Slightly or Not at All (1)	A Little (2)	Moderately (3)	Quite a Bit (4)	Extremely (5)
Interested (1)	○	○	○	○	○
Excited (2)	○	○	○	○	○
Strong (3)	○	○	○	○	○
Enthusiastic (4)	○	○	○	○	○
Proud (5)	○	○	○	○	○
Alert (6)	○	○	○	○	○
Inspired (7)	○	○	○	○	○
Determined (8)	○	○	○	○	○

Attentive (9)							
Active (10)							
Distressed (11)							
Upset (12)							
Guilty (13)							
Scared (14)							
Hostile (15)							
Irritable (16)							
Ashamed (17)							
Nervous (18)							
Jittery (19)							
Afraid (20)							

Please rate the following statements on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

Survey Items and Response Scale

Item	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I found the uses of coffee in this ad expected. (1)							
The ad showed coffee in ways I am familiar with. (2)							
The presentation of coffee in the ad was typical. (3)							
The ad contained ideas that moved from one subject to another. (4)							
The ad shifted from one idea to another. (5)							
The ad connected objects that are usually unrelated. (6)							
The ad brought unusual items together. (7)							

Demographics:

How old are you? _____

What is your gender?

Male (1)

Female (2)

Non-binary / third gender (3)

Prefer not to say (4)

10. Appendix 3

Results from Pre-Test:

Statistics

Age

N	Valid	15
	Missing	0
Mean		29.83
Minimum		21
Maximum		56

Table 3: Pre-Test Descriptives – Demographics Age

How do you describe yourself? - Selected Choice

	N	%
Male	9	60%
Female	6	40%

Table 4: Pre-Test Descriptives – Demographics Gender

Descriptive Statistics for Image Conditions

Image Condition	Positive Emotions	Negative Emotions	Manipulation Check	Product Valuation
	M	*SD*	*M*	*SD*
Broken Functional Fixedness 3 Motion Depiction	2.35	1.35	1.14	0.48
Broken Functional Fixedness 3 No Motion Depiction	2.35	1.42	1.31	0.65
Maintained Functional Fixedness - Motion Depiction	1.94	1.17	1.31	0.78
Maintained Functional Fixedness - No Motion Depiction	1.77	0.95	1.16	0.49

Table 5: Pre-Test Descriptives - Image Condition

P values of T-Test Comparisons Across Experimental Conditions

T-Test Comparison	Positive Emotions	Negative Emotions	Manipula-tion Check	Ad Contained Ideas That Moved From One Subject to Another	Ad Shifted From One Idea to Another	Ad Connected Objects That Are Usually Unrelated	Ad Brought Unusual Items Together
T-Test Type	Two-tailed, Paired	Two-tailed, Paired	Two-tailed, Paired	One-tailed, Paired	One-tailed, Paired	One-tailed, Paired	One-tailed, Paired
Broken FF 3 Motion Depiction vs. Maintained FF 3 No Motion Depiction	.021	.774	.085	.001	.028	.001	.002
Maintained FF 3 No Motion Depiction vs. Broken FF 3 No Motion Depiction	.027	.149	.098	.011	.006	.001	.001
Maintained FF 3 Motion Depiction vs. Broken FF 3 No Motion Depiction	.130	1.000	.106	.014	.031	.001	.000
Maintained FF 3 Motion Depiction vs. Broken FF 3 Motion Depiction	.092	.774	.066	.001	.065	.001	.000

Table 6: Pre-Test - T-Test Results

11. Appendix 4

Survey Flow:

Start of Block: Section 1: Start

Welcome and thank you for considering taking part in this survey on decision making in social media advertising!

I, Mona Heseler, am conducting this survey as part of my Master's thesis at the Católica Lisbon School of Business and Economics, under the supervision of Filipa de Almeida.

We are researching how people interact with advertising on social media. Your insights will help us better understand how different types of advertising influence consumer behaviour. In this survey you will be shown an advertisement and asked some questions based on your experience. Please take the time to answer honestly. There are no right or wrong answers - we are just interested in your personal reactions. All answers will be kept strictly confidential and anonymous. This means that it will not be possible to link your answers to your identity. The data collected will be used for research purposes only and may be presented in my dissertation or published in academic journals, always in aggregate form, never about any individual response. We ask that you complete

the study at one time, without interruption. You can change your mind and drop out at any point during the study. The survey should take about **4 minutes** to complete.

If you answer attentively, you'll have the chance to **win a €25 Amazon gift card**! Simply enter your email address in the new linked survey at the end to ensure anonymity.

If you have any questions about this study, please email Mona Heseler (s-mheseler@ucp.pt). By continuing, you are agreeing to participate. Thank you very much! P.S: This survey contains credits to get free survey responses at **SurveySwap.io.** Users of the **SurveyCircle.com** research platform receive SurveyCircle points for their participation.

Q1 Please answer the following question on a scale of 1 to 7, where 1 = not at all interested and 7 = very interested

	1	2	3	4	5	6	7
How interested are you in coffee products? ()							

End of Block: Section 1: Start

Start of Block: Group 1: Breaking Functional Fixedness

Intro - Ad Please carefully view the following advertisement. Take as much time as you need to review the ad before proceeding.

Q2 - Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

Randomized: Experimental or Control Ad was presented

End of Block: Group 1: Breaking Functional Fixedness

Start of Block: Section 2: Viewing the Advertisement

Randomized Condition distribution and presentation of the according Advertisement.

Start of Block: Section 3: Post Viewing Questions

Q4 - Statements Please rate the following statements on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

Survey Items and Response Scale

Item	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I examined the main elements of the ad very carefully.	•	•	•	•	•	•	•
The ad demanded my attention.	•	•	•	•	•	•	•
I really wanted to understand the ad.	•	•	•	•	•	•	•
I was able to imagine using the product in the advertisement.	•	•	•	•	•	•	•
I remember the advertised product in the ad.	•	•	•	•	•	•	•
Attention Check: Please check "Disagree."	•	•	•	•	•	•	•

Q5 - Ad Description Please describe how the product was presented in the advertisement.

_____

Q6 - Purchase If you were about to buy coffee and had the option of buying the coffee just advertised, what would you say is the probability that you would...

	Very Improbable (1)	Improbable (2)	Somewhat Improbable (3)	Neither Probable nor Improbable (4)	Somewhat Probable (5)	Probable (6)	Very Probable (7)
Try out the advertised product? (1)	•	•	•	•	•	•	•
Purchase the advertised product? (2)	•	•	•	•	•	•	•
Pay a higher price for this product? (3)	•	•	•	•	•	•	•

Manipulation Check Please rate the following statements on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I found the uses of coffee in this ad expected. (1)	•	•	•	•	•	•	•
The ad showed coffee in ways I am familiar with. (2)	•	•	•	•	•	•	•
The presentation of coffee in the ad was typical. (3)	•	•	•	•	•	•	•

End of Block: Section 3: Post Viewing Questions

Start of Block: Section 4: Demographics

Q7 How old are you? _____

Q8 How do you describe yourself?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer to self-describe (4) _____
- Prefer not to say (5)

Q09 What is your current employment status?

- Employed full time (1)
- Employed part time (2)
- Unemployed (3)
- Retired (4)
- Student (5)
- Other (6)

Q10 What is your current yearly income before taxes?

- Less than €20,000 (1)
- €20,000 - €39,999 (2)
- €40,000 - €59,999 (3)
- €60,000 - €79,999 (4)
- €80,000 - €99,999 (5)
- €100,000 - €119,999 (6)
- €120,000 - €139,999 (8)
- More than €140,000 (7)

Q11 What country do you currently live in?

▼ Afghanistan (1) ... Zimbabwe (1357)

End of Block: Section 4: Demographics

12. Appendix 5

How do you describe yourself? - Selected Choice

	N	%
Male	49	33.3%
Female	98	66.7%

Table 7: Demographics - Gender

What is your current employment status?

	N	%
Employed full time	47	32.0%

Employed part time	20	13.6%
Unemployed	2	1.4%
Retired	6	4.1%
Student	69	46.9%
Other	3	2.0%

Table 8: Demographics - Employment

What is your current yearly income before taxes?

	N	%
Less than €20,000	63	42.9%
€20,000 - €39,999	32	21.8%
€40,000 - €59,999	27	18.4%
€60,000 - €79,999	9	6.1%
€80,000 - €99,999	4	2.7%
€100,000 - €119,999	7	4.8%
€120,000 - €139,999	2	1.4%
More than €140,000	3	2.0%

Table 9: Demographics - Income

List of Countries

	N	%
Australia	1	0.7%
Austria	1	0.7%
Azerbaijan	1	0.7%
Canada	1	0.7%
Egypt	1	0.7%
France	2	1.4%
Germany	123	83.7%
Netherlands	5	3.4%
Norway	1	0.7%
Pakistan	1	0.7%
Singapore	1	0.7%
Spain	1	0.7%
Sweden	1	0.7%
United Kingdom of Great Britain and Northern Ireland	7	4.8%

Table 10: Demographics – Country

Statistics

Age

N	Valid	147
	Missing	0
Mean		32.13
Minimum		16
Maximum		78

Table 11: Demographics - Age

13. Appendix 6

Descriptive Statistics

Group Statistics

	Manipulation - Broken Functional Fixedness	N	Mean	Std. Deviation	Std. Error Mean
How interested are you in coffee products?	Control	70	4.3286	1.95397	.23354
	Experimental	75	4.6400	1.94269	.22432

Table 12: Level of Interest in Coffee

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
										95% Confidence Interval of the Difference	
						Significance		Mean	Std. Error		
		F	Sig.	t	df	One-Sided p	Two-Sided p	Difference	Difference	Lower	Upper
How interested are you in coffee products?	Equal variances assumed	.007	.934	-.962	143	.169	.338	-.31143	.32376	-.95141	.32855
	Equal variances not assumed			-.962	142.194	.169	.338	-.31143	.32383	-.95157	.32871

Table 13: Level of Interest in Coffee - Independent Samples Test

Independent Samples Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
How interested are you in coffee products?	Cohen's d	1.94814	-.160	-.486	.167
	Hedges' correction	1.95844	-.159	-.483	.166
	Glass's delta	1.94269	-.160	-.487	.167

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Table 14: Level of Interest in Coffee - Independent Samples Effect Sizes

Reliability Statistics

Cronbach's Alpha	N of Items
.741	3

Table 15: Manipulation Check - Reliability Analysis

Item Statistics

	Mean	Std. Deviation	N
I found the uses of coffee in this ad expected.	4.98	1.704	160
The ad showed coffee in ways I am familiar with.	5.36	1.503	160
The presentation of coffee in the ad was typical.	4.63	1.776	160

Table 16: Manipulation Check – Descriptives

Group Statistics

	Experimental - Broken Functional Fixedness	N	Mean	Std. Deviation	Std. Error Mean
Manipulation_ Check	Control	72	5.2963	1.10279	.12996
	Experimental	75	4.5644	1.46118	.16872

Table 17: Manipulation Check – Independent Samples Test Statistics

Independent Samples Test

	Levene's Test for	t-test for Equality of Means

		Equality of Variances									
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Manipulation Check	Equal variances assumed	2.708	.102	3.417	145	<.001	<.001	.73185	.21418	.30854	1.15517
	Equal variances not assumed			3.436	137.437	<.001	<.001	.73185	.21297	.31072	1.15298

Table 18: Manipulation Check – Independent Samples Test

Independent Samples Effect Sizes

			95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Manipulation Check	Cohen's d	1.29811	.564	.233	.893
	Hedges' correction	1.30488	.561	.232	.888
	Glass's delta	1.46118	.501	.166	.833

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Table 19: Manipulation Check – Independent Samples Effect Size

Correlations

		Interest_in_Coffee	Manipulation - Broken Functional Fixedness	Cognitive_Engagement	Product_Recall	Purchase_Scale
Interest_in_Coffee	Pearson Correlation	1	.080	.410**	.140	.579**
	Sig. (2-tailed)		.338	<.001	.093	<.001
	N	145	145	145	145	145
Manipulation - Broken Functional Fixedness	Pearson Correlation	.080	1	.211*	.113	.190*
	Sig. (2-tailed)	.338		.010	.172	.021
	N	145	147	147	147	147
Cognitive_Engagement	Pearson Correlation	.410**	.211*	1	.529**	.682**
	Sig. (2-tailed)	<.001	.010		<.001	<.001
	N	145	147	147	147	147
Product_Recall	Pearson Correlation	.140	.113	.529**	1	.314**
	Sig. (2-tailed)	.093	.172	<.001		<.001
	N	145	147	147	147	147
Purchase_Scale	Pearson Correlation	.579**	.190*	.682**	.314**	1

Sig. (2-tailed)	<.001	.021	<.001	<.001	
N	145	147	147	147	147

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 20: Correlations between all items

Reliability Statistics

Cronbach's Alpha	N of Items
.819	4

Table 21: Reliability Statistics - Cognitive Engagement

Correlations

		I examined the main elements of the ad very carefully.	The ad demanded my attention.	I really wanted to understand the ad.	I was able to imagine using the product in the advertisement.
I examined the main elements of the ad very carefully.	Pearson Correlation	1	.551**	.592**	.476**
	Sig. (2-tailed)		<.001	<.001	<.001
	N	147	147	147	147
The ad demanded my attention.	Pearson Correlation	.551**	1	.614**	.501**
	Sig. (2-tailed)	<.001		<.001	<.001
	N	147	147	147	147
I really wanted to understand the ad.	Pearson Correlation	.592**	.614**	1	.527**
	Sig. (2-tailed)	<.001	<.001		<.001
	N	147	147	147	147
I was able to imagine using the product in the advertisement.	Pearson Correlation	.476**	.501**	.527**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	147	147	147	147

**. Correlation is significant at the 0.01 level (2-tailed).

Table 22: Correlations - Cognitive Engagement

Reliability Statistics

Cronbach's Alpha	N of Items
.922	3

Table 23: Reliability Statistics - Purchase Scale

14. Appendix 7

PROCESS Matrix Output

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 4.2 ********

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
```

```
    Documentation available in Hayes (2022).
www.guilford.com/p/hayes3

**************************************************************************
Model  : 6
    Y  : PI
    X  : FF
   M1  : CE
   M2  : PR

Sample
Size:  147

**************************************************************************
OUTCOME VARIABLE:
 CE

Model Summary
          R       R-sq        MSE          F         df1
df2          p
      .2114       .0447     1.4695     6.7847     1.0000
145.0000      .0102

Model
              coeff         se          t          p       LLCI
ULCI
constant     4.8090      .1429    33.6616      .0000     4.5267
5.0914
FF            .5210      .2000     2.6047      .0102      .1257
.9163

Standardized coefficients
        coeff
FF      .4215

**************************************************************************
OUTCOME VARIABLE:
 PR

Model Summary
          R       R-sq        MSE          F         df1
df2          p
      .5292       .2801     1.5935    28.0125     2.0000
144.0000      .0000

Model
```

```
              coeff         se           t           p       LLCI
ULCI
constant     2.2789      .4417     5.1597      .0000     1.4059
3.1519
FF            .0045      .2131      .0211      .9832     -.4167
.4257
CE            .6323      .0865     7.3113      .0000      .4613
.8032

Standardized coefficients
        coeff
FF      .0030
CE      .5289

************************************************************
OUTCOME VARIABLE:
 PI

Model Summary
          R       R-sq        MSE          F        df1
df2          p
      .6862      .4709     1.5781    42.4176     3.0000
143.0000      .0000

Model
              coeff         se           t           p       LLCI
ULCI
constant     -.5593      .4785    -1.1689      .2444    -1.5050
.3865
FF            .1619      .2121      .7634      .4465     -.2573
.5811
CE            .9773      .1008     9.6976      .0000      .7781
1.1765
PR           -.0751      .0829     -.9061      .3664     -.2391
.0888

Standardized coefficients
        coeff
FF      .0947
CE      .7067
PR     -.0650

************************** TOTAL EFFECT MODEL
****************************
OUTCOME VARIABLE:
 PI
```

```
Model Summary
          R       R-sq        MSE          F        df1
df2          p
      .1896      .0359     2.8357     5.4049     1.0000
145.0000      .0215

Model
             coeff         se          t          p       LLCI
ULCI
constant     3.7407      .1985    18.8494      .0000     3.3485
4.1330
FF            .6459      .2778     2.3248      .0215      .0968
1.1951

Standardized coefficients
        coeff
FF      .3779


************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y ***

Total effect of X on Y
     Effectse       t           p          LLCI
ULCI       c_ps
      .6459      .2778     2.3248      .0215      .0968
1.1951      .3779

Direct effect of X on Y
     Effect         se          t          p       LLCI
ULCI      c'_ps
      .1619      .2121      .7634      .4465     -.2573
.5811      .0947

Indirect effect(s) of X on Y:
          Effect     BootSE   BootLLCI   BootULCI
TOTAL      .4840      .1946      .1134      .8696
Ind1       .5091      .2043      .1255      .9216
Ind2      -.0003      .0260     -.0734      .0358
Ind3      -.0248      .0337     -.1098      .0282

Partially standardized indirect effect(s) of X on Y:
          Effect     BootSE   BootLLCI   BootULCI
TOTAL      .2832      .1105      .0689      .4969
Ind1       .2979      .1154      .0757      .5267
Ind2      -.0002      .0152     -.0428      .0210
Ind3      -.0145      .0194     -.0630      .0163
```

```
Indirect effect key:
Ind1 FF          ->    CE          ->    PI
Ind2 FF          ->    PR          ->    PI
Ind3 FF          ->    CE          ->    PR          ->    PI

************************ ANALYSIS NOTES AND ERRORS
************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence
intervals:
  5000

NOTE: Standardized coefficients for dichotomous or
multicategorical X are in
      partially standardized form.

------ END MATRIX -----
```

15. Appendix 8

Content Analysis: Relationship Between Manipulation and Open-Ended Product Recall Categories

To analyze the open-ended answers for product recall, I conducted a content analysis, clustering and rating the responses into different categories, including product elements, emotional responses, and advertising elements, as well as subcategories within each. These responses were assessed to determine whether the elements were mentioned or not.

First, I conducted a chi-square test of independence to examine the relationship between the experimental condition (breaking functional fixedness) and the recall of product elements. The results revealed a significant association, $\chi^2(1, N = 147) = 7.18$, $p = .007$. Participants in the control condition were significantly more likely to recall product elements (56.4%) compared to those in the experimental condition (43.6%). This suggests that while participants in the experimental condition may have engaged more deeply with the advertisement, they focused less on recalling specific product-related details. Further analysis of subcategories within product elements gave additional insights. A chi-square test revealed a significant association for the recall of coffee machine elements, $\chi^2(1, N = 147) = 8.31$, $p = .004$, with participants in the control condition recalling coffee machine elements more frequently (61.1%) than those in the experimental condition (38.9%). Similarly, secondary products showed a significant association, $\chi^2(1, N = 147)$

= 4.94, p = .026, where participants in the control condition recalled secondary product elements more frequently (58.3%) compared to participants in the experimental condition (41.7%). For emotional responses, the chi-square test assessing the relationship between the experimental condition and recall of emotional elements was not significant, $\chi^2(1, N = 147) = 1.48$, p = .224. Although participants in the experimental condition mentioned emotional responses more frequently (58.0%) than those in the control condition (42.0%), this difference did not reach statistical significance. I also conducted a chi-square test to assess the recall of advertising elements. The results indicated a significant association, $\chi^2(1, N = 147) = 4.36$, p = .037, with participants in the control condition recalling advertising elements more frequently (68.0%) than those in the experimental condition (32.0%). This suggests that while participants in the experimental condition may have processed the advertisement more deeply, they were less focused on recalling specific advertising-related details. Within the subcategories of advertising elements, a significant association was observed for taglines and slogans, $\chi^2(1, N = 147) = 6.17$, p = .013. Participants in the control condition were much more likely to recall taglines or slogans (83.3%) compared to those in the experimental condition (16.7%). These findings suggest that breaking functional fixedness may encourage deeper cognitive engagement, but it does not necessarily enhance the recall of specific details such as product elements, emotional responses, or advertising components. The detailed results are presented in the tables below.

Crosstab

			Manipulation - Broken Functional Fixedness		
			Control	Experimental	Total
Product_ Elements	Not mentioned	Count	15	31	46
		% within Product_Elements	32.6%	67.4%	100.0%
	Mentioned	Count	57	44	101
		% within Product_Elements	56.4%	43.6%	100.0%
Total		Count	72	75	147
		% within Product_Elements	49.0%	51.0%	100.0%

Table 24: Product Recall - Product Elements Crosstabs

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.180[a]	1	.007		
Continuity Correction[b]	6.258	1	.012		
Likelihood Ratio	7.300	1	.007		
Fisher's Exact Test				.008	.006
Linear-by-Linear Association	7.131	1	.008		
N of Valid Cases	147				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 22.53.

b. Computed only for a 2x2 table

Table 25: Product Recall - Product Elements Chi-Square Tests

Crosstab

			Manipulation - Broken Functional Fixedness		
			Control	Experimental	Total
Product_Elements_Coffee_Machine	Not mentioned	Count	28	47	75
		% within Product_Elements_Coffee_Machine	37.3%	62.7%	100.0%
	Mentioned	Count	44	28	72
		% within Product_Elements_Coffee_Machine	61.1%	38.9%	100.0%
Total		Count	72	75	147
		% within Product_Elements_Coffee_Machine	49.0%	51.0%	100.0%

Table 26: Product Recall - Product Elements Coffee Machine Crosstabs

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.311[a]	1	.004		
Continuity Correction[b]	7.387	1	.007		
Likelihood Ratio	8.390	1	.004		
Fisher's Exact Test				.005	.003
Linear-by-Linear Association	8.255	1	.004		
N of Valid Cases	147				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 35.27.
b. Computed only for a 2x2 table

Table 27: Product Recall - Product Elements Coffee Machine Chi-Square Test

Crosstab

			Manipulation - Broken Functional Fixedness		
			Control	Experimental	Total
Product_Elements_Secondary_Product	Not mentioned	Count	30	45	75
		% within Product_Elements_Secondary_Product	40.0%	60.0%	100.0%
	Mentioned	Count	42	30	72
		% within Product_Elements_Secondary_Product	58.3%	41.7%	100.0%
Total		Count	72	75	147
		% within Product_Elements_Secondary_Product	49.0%	51.0%	100.0%

Table 28: Product Element - Secondary Product Crosstabs

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.941[a]	1	.026		
Continuity Correction[b]	4.234	1	.040		
Likelihood Ratio	4.968	1	.026		
Fisher's Exact Test				.032	.020
Linear-by-Linear Association	4.907	1	.027		
N of Valid Cases	147				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 35.27.
b. Computed only for a 2x2 table

Table 29: Product Element - Secondary Product Chi-Square

Crosstab

			Manipulation - Broken Functional Fixedness		
			Control	Experimental	Total
Emotional_Responses	Not mentioned	Count	51	46	97
		% within Emotional_Responses	52.6%	47.4%	100.0%
	Mentioned	Count	21	29	50
		% within Emotional_Responses	42.0%	58.0%	100.0%
Total		Count	72	75	147
		% within Emotional_Responses	49.0%	51.0%	100.0%

Table 30: Product Recall - Emotional Elements Crosstabs

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.477[a]	1	.224		
Continuity Correction[b]	1.084	1	.298		

Likelihood Ratio	1.482	1	.223		
Fisher's Exact Test				.296	.149
Linear-by-Linear Association	1.467	1	.226		
N of Valid Cases	147				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 24.49.

b. Computed only for a 2x2 table

Table 31: Product Recall - Emotional Elements Chi-Square Test

Crosstab

			Manipulation - Broken Functional Fixedness		
			Control	Manipulation	Total
Advertising_ Elements	Not mentioned	Count	55	67	122
		% within Advertising_Elements	45.1%	54.9%	100.0%
	Mentioned	Count	17	8	25
		% within Advertising_Elements	68.0%	32.0%	100.0%
Total		Count	72	75	147
		% within Advertising_Elements	49.0%	51.0%	100.0%

Table 32: Product Recall - Advertising Elements Crosstabs

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.361[a]	1	.037		
Continuity Correction[b]	3.492	1	.062		
Likelihood Ratio	4.435	1	.035		
Fisher's Exact Test				.048	.030
Linear-by-Linear Association	4.331	1	.037		
N of Valid Cases	147				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.24.

b. Computed only for a 2x2 table

Table 33: Product Recall - Advertising Elements Chi-Square Test

Crosstab

			Manipulation - Broken Functional Fixedness		
			Control	Experimental	Total
Advertising _Elements_ Taglines_or _Slogans	Not mentioned	Count	62	73	135
		% within Advertising_Elements_Taglines_or_Slogans	45.9%	54.1%	100.0%

Mentioned	Count	10	2	12
	% within Advertising_Elements_Taglines_or_Slogans	83.3%	16.7%	100.0%
Total	Count	72	75	147
	% within Advertising_Elements_Taglines_or_Slogans	49.0%	51.0%	100.0%

Table 34: Product Recall - Advertising Elements Taglines Slogans Crosstabs

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.171[a]	1	.013		
Continuity Correction[b]	4.765	1	.029		
Likelihood Ratio	6.658	1	.010		
Fisher's Exact Test				.016	.013
Linear-by-Linear Association	6.129	1	.013		
N of Valid Cases	147				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.88.

b. Computed only for a 2x2 table

Table 35: Product Recall - Advertising Elements Taglines Slogans Chi-Square Tests

16. Appendix 9

To further explore the relationship between breaking functional fixedness and purchase intentions, two separate mediation analyses were conducted using PROCESS Model 4. Each analysis included either cognitive engagement or product recall as the sole mediator. The results are outlined below. The first analysis examined cognitive engagement as the sole mediator. Breaking functional fixedness significantly predicted cognitive engagement (B = 0.52, SE = 0.20, $t(145) = 2.60$, $p = .010$, 95% CI [0.13, 0.92]). Cognitive engagement, in turn, significantly predicted purchase intentions (B = 0.93, SE = 0.09, $t(144) = 10.81$, $p < .001$, 95% CI [0.76, 1.10]). The indirect effect of breaking functional fixedness on purchase intentions through cognitive engagement was significant (Effect = 0.48, BootSE = 0.19, 95% CI [0.11, 0.87]). However, the direct effect of breaking functional fixedness on purchase intentions was not significant in this model (B = 0.16, SE = 0.21, $t(144) = 0.76$, $p = .447$, 95% CI [-0.26, 0.58]). These results suggest that cognitive engagement may fully mediate the relationship between breaking functional fixedness and purchase intentions. The second analysis explored product recall as the sole mediator. Breaking

functional fixedness did not significantly predict product recall (B = 0.33, SE = 0.24, $t(145) = 1.37$, $p = .172$, 95% CI [-0.15, 0.81]). However, product recall significantly predicted purchase intentions (B = 0.34, SE = 0.09, $t(144) = 3.78$, $p < .001$, 95% CI [0.16, 0.52]). The indirect effect of breaking functional fixedness on purchase intentions through product recall did not reach significance (Effect = 0.11, BootSE = 0.09, 95% CI [-0.05, 0.31]). In contrast to the first model, the direct effect of breaking functional fixedness on purchase intentions remained significant (B = 0.53, SE = 0.27, $t(144) = 1.99$, $p = .049$, 95% CI [0.002, 1.06]). These findings suggest that product recall may not mediate the relationship between breaking functional fixedness and purchase intentions.

The results of these additional mediation analyses provide further insight into the role of cognitive engagement and product recall in explaining the effect of breaking functional fixedness on purchase intentions. Cognitive engagement appears to fully mediate the relationship, whereas product recall does not. These findings suggest that cognitive engagement may play a more central role in driving purchase intentions.

17. Appendix 10

To To test the robustness of the serial mediation model, I used Time Spent on the advertisment page as an alternative mediator instead of Cognitive Engagement**.** The statistical analysis was conducted using Hayes9 PROCESS macro for SPSS (Model 6) with 5,000 bootstrap resamples and a 95% confidence interval. Additionally, to address potential biases in the data, two outliers were identified and removed based on z-scores for Time Spent, ensuring more accurate and reliable estimates.

The results of the first regression revealed that breaking functional fixedness did not significantly predict time spent ($b = 0.15$, $SE = 0.11$, $t(143) = 1.42$, $p = .158$). The 95% confidence interval ranged from -0.06 to 0.36, and the standardized coefficient was $\beta = 0.24$, indicating a small effect size. These findings suggest that breaking functional fixedness does not significantly influence the time spent viewing the advertisement after outliers are removed. In the second regression analysis, time spent and breaking functional fixedness were used to predict product recall. The results indicated that neither time spent ($b = 0.34$, $SE = 0.19$, $t(142) = 1.78$, $p = .078$) nor breaking functional fixedness ($b = 0.29$, $SE = 0.25$, $t(142) = 1.16$, $p = .246$) significantly predicted product recall. While the relationship between time spent and product recall approached marginal significance, the confidence intervals for both predictors included zero, suggesting no clear effect. In the final regression analysis predicting purchase intentions, product recall significantly predicted

purchase intentions (b = 0.36, SE = 0.09, t(141) = 3.86, p < .001), with a standardized coefficient of β = 0.31. However, time spent did not significantly predict purchase intentions (b = -0.14, SE = 0.21, t(141) = -0.65, p = .515), and the direct effect of breaking functional fixedness on purchase intentions was significant (b = 0.54, SE = 0.27, t(141) = 2.00, p = .048).

The indirect effects were examined to determine whether time spent mediated the relationship between breaking functional fixedness and purchase intentions. The total indirect effect was not significant (effect = 0.10, *Boot SE* = 0.10, *Boot LLCI* = -0.09, *Boot ULCI* = 0.33). Specifically, the indirect effect of breaking functional fixedness on purchase intentions through time spent alone was not significant (effect = -0.02, *Boot SE* = 0.04, *Boot LLCI* = -0.11, *Boot ULCI* = 0.08). Similarly, the sequential mediation pathway, including both time spent and product recall, was also not significant (effect = 0.02, *Boot SE* = 0.02, *Boot LLCI* = -0.01, *Boot ULCI* = 0.07).

In conclusion, the robustness check using time spent as an alternative mediator does not provide evidence of significant mediation effects. While breaking functional fixedness showed no significant relationship with time spent after outlier removal, the sequential mediation pathway involving time spent and product recall also did not significantly predict purchase intentions. These results confirm that the findings of the main analysis remain robust and are not influenced by this alternative operationalization of the mediator.

18. Appendix 11

To further understand the role of coffee interest in the relationship between breaking functional fixedness, cognitive engagement, product recall, and purchase intentions, two additional PROCESS analyses were conducted using coffee interest as a covariate.

The first analysis incorporated coffee interest as a covariate while maintaining both cognitive engagement and product recall as mediators. Breaking functional fixedness significantly predicted cognitive engagement (B = 0.47, SE = 0.19, t(142) = 2.51, p = .013, 95% CI [0.10, 0.83]). Coffee interest was also significantly associated with cognitive engagement (B = 0.25, SE = 0.05, t(142) = 5.26, p < .001, 95% CI [0.16, 0.35]). Breaking functional fixedness did not significantly predict product recall (B = 0.02, SE = 0.22, t(141) = 0.11, p = .912, 95% CI [-0.40, 0.45]). However, cognitive engagement significantly predicted product recall (B = 0.67, SE = 0.10, t(141) = 7.04, p < .001, 95% CI [0.48, 0.86]). Coffee interest did not significantly predict product recall (B = -0.07, SE = 0.06, t(141) = -1.17, p = .246, 95% CI [-0.19, 0.05]). Cognitive engagement was a significant predictor of purchase intentions (B = 0.74, SE = 0.10, t(140) = 7.57, p < .001, 95% CI [0.55, 0.94]),

but product recall was not (B = -0.03, SE = 0.07, t(140) = -0.40, p = .688, 95% CI [-0.18, 0.12]). Coffee interest significantly predicted purchase intentions (B = 0.31, SE = 0.05, t(140) = 5.89, p < .001, 95% CI [0.21, 0.42]). The direct effect of breaking functional fixedness on purchase intentions was not significant (B = 0.16, SE = 0.19, t(140) = 0.83, p = .409, 95% CI [-0.22, 0.54]). The total indirect effect was significant (Effect = 0.34, BootSE = 0.15, 95% CI [0.06, 0.65]). The indirect effect through cognitive engagement alone was significant (Effect = 0.35, BootSE = 0.15, 95% CI [0.07, 0.68]), while the indirect effect through product recall and the sequential mediation pathway were not significant.

To account for participants with low coffee interest, a second analysis was conducted by excluding participants with a coffee interest level of 2 or lower. This resulted in a reduced sample size of 112. Breaking functional fixedness significantly predicted cognitive engagement (B = 0.49, SE = 0.22, t(109) = 2.24, p = .027, 95% CI [0.06, 0.92]). Coffee interest was also significantly associated with cognitive engagement (B = 0.36, SE = 0.09, t(109) = 4.11, p < .001, 95% CI [0.19, 0.53]). Breaking functional fixedness did not significantly predict product recall (B = -0.04, SE = 0.24, t(108) = -0.15, p = .879, 95% CI [-0.50, 0.43]). Cognitive engagement significantly predicted product recall (B = 0.64, SE = 0.10, t(108) = 6.36, p < .001, 95% CI [0.44, 0.84]), while coffee interest did not (B = -0.02, SE = 0.10, t(108) = -0.20, p = .839, 95% CI [-0.22, 0.18]). Cognitive engagement significantly predicted purchase intentions (B = 0.79, SE = 0.11, t(107) = 7.54, p < .001, 95% CI [0.58, 1.00]). Product recall did not predict purchase intentions (B = 0.01, SE = 0.09, t(107) = 0.06, p = .949, 95% CI [-0.16, 0.17]). Coffee interest significantly predicted purchase intentions (B = 0.20, SE = 0.09, t(107) = 2.28, p = .025, 95% CI [0.03, 0.37]). The direct effect of breaking functional fixedness on purchase intentions was not significant (B = 0.22, SE = 0.21, t(107) = 1.07, p = .288, 95% CI [-0.19, 0.64]). The total indirect effect was significant (Effect = 0.39, BootSE = 0.18, 95% CI [0.05, 0.76]). The indirect effect through cognitive engagement alone was significant (Effect = 0.39, BootSE = 0.18, 95% CI [0.06, 0.77]), while the indirect effect through product recall and the sequential mediation pathway were not significant.

These analyses highlight the role of coffee interest in influencing the relationships between breaking functional fixedness, cognitive engagement, product recall, and purchase intentions. When coffee interest was included as a covariate or participants with low interest were excluded, cognitive engagement consistently emerged as a significant mediator, while product recall did not

explain the relationship. These findings underscore the importance of individual interest levels in shaping advertising outcomes.