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Citation: Marckhgott, E., Kamleitner, B. & Estes, Z. (2026). A window of opportunity: transparent packaging affects product preference via psychological ownership. International Journal of Research in Marketing, 43(3), pp. 929-946. doi: 10.1016/j.ijresmar.2026.01.008

This is the accepted version of the paper.

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Permanent repository link: https://openaccess.city.ac.uk/id/eprint/36916/

Link to published version: https://doi.org/10.1016/j.ijresmar.2026.01.008

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A Window of Opportunity:
Transparent Packaging Affects Product Preference via Psychological Ownership

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In press (Jan 2026), *International Journal of Research in Marketing*

ABSTRACT

Transparent packaging allows consumers to view and inspect the product. We suggest that transparent packaging reduces the psychological barrier between a product and its prospective consumers, and we propose that transparency allows for a more intimate bond with the product and thus increases product preference compared to opaque packaging. In seven studies, we find that consumers prefer products that can be seen through transparent packaging and that psychological ownership plays an important role in this. Drawing on this theory, we also provide evidence for relevant boundary conditions: The preference for products in transparent packaging is reduced when the unpackaged product would be undesirable, and when ownership is not expected (i.e., when the product is bought for someone else). These results extend prior accounts based on packaging attractiveness and product information, they advance the literature on psychological ownership, and they provide valuable insights for practitioners.

Keywords: Packaging transparency, package window, psychological ownership, visual barrier

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1. INTRODUCTION

Walking through a supermarket, consumers are exposed to thousands of products, most of which are presented in their packaging. On closer inspection, consumers will find that some packages hide what they contain, while others allow for a peek at what lies within. Based on what is offered on supermarket shelves, there seems to be little consensus among brands on whether to allow customers to peek at the product. To illustrate, we analyzed the entire nuts, trail mix, and seeds category in the online shop of Kroger's, the largest US supermarket chain. Out of 867 stock keeping units that were presented in their packaging, 62% hid their content entirely in an opaque package. Of the remaining 38%, the majority featured a transparent window (25%), while 13% were fully transparent.

Although transparency is a common packaging feature, whether and how it affects product preference is a largely open question. Focusing on food products where transparency is an often-used packaging feature, we suggest and show that consumers prefer transparent packaging to opaque packaging. This proposition rests on a novel mechanism that goes beyond the direct changes in packaging or product perceptions that transparency implies, such as an improved aesthetic appearance and more objective product information (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). Essentially, we argue that people develop enhanced psychological ownership (i.e., the feeling that something is "mine;" (Pierce et al., 2003)) for products in transparent packaging, which in turn strengthens their preference. This occurs because transparent packaging reduces the visual barrier between a product and the outside world, including prospective consumers (Deng & Srinivasan, 2013; Marquardt et al., 2015; Patrick et al., 2017), thereby changing the affordances of the packaged product in ways that facilitate and invite processes of psychological appropriation (Baxter et al., 2015; Cheng et al., 2018; Kamleitner & Mitchell, 2018). Beyond changing the product unit aesthetically, packaging transparency allows intimate glimpses and provides greater scope for interacting with the packaged product even before purchase or direct experience.

Drawing on this theorizing, the positive impact of packaging transparency on product preference should be attenuated for products that consumers are not motivated to psychologically own. This implies two practically relevant boundary conditions. First, the preference for products in transparent packaging is reduced when consumers are unlikely to desire the product due to its unappealing looks (Kamleitner & Mitchell, 2018; Pierce et al., 2003). Second, the preference for products in transparent packaging also attenuates when ownership is not expected, such as when consumers buy the product for someone else (Tari & Trudel, 2024).

This research contributes to the scarce existing knowledge about consumer consequences of packaging transparency. Prior literature provides no consistent evidence on whether transparency enhances product preference (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). The limited evidence available largely suggests that transparency affects consumers by altering their perception of products through the information it provides and its visual impact on a product's aesthetics (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). We propose an important additional psychological process: Transparency can also trigger a sense of appropriation, a mechanism consistently found to increase product preference (Peck & Luangrath, 2023; Peck & Shu, 2009; Reb & Connolly, 2007). We suggest and show that transparency affects preference primarily because and when psychological ownership is triggered.

On a broader level this research also contributes to literature on the effect of barriers in a product context. Previous research has demonstrated both positive (Deng & Srinivasan, 2013; Morales & Fitzsimons, 2007; Patrick et al., 2017) and negative (Szocs et al., 2021) effects of packaging as a barrier. We argue that transparent packaging can reduce the barrier between the product and the consumer and in turn facilitate the formation of psychological ownership for the product while retaining the protective properties. This research thus also

adds to the growing literature on psychological ownership. It shows that packaging can enable the development of psychological ownership for a product and adds to literature highlighting the role of ownership motivation (Kamleitner & Mitchell, 2018; Tari & Trudel, 2024). On a more general level, we provide the first demonstration that the removal of a barrier may increase psychological ownership.

Our findings are also useful for practitioners. They highlight that the addition of a packaging window can, in most cases, be a window of opportunity. At the same time, our results provide guidance on when this may not hold true.

2. THEORETICAL BACKGROUND

In this section, we first briefly review prior research on how consumers react to transparent packaging. We then explain our theoretical rationale for why transparent packaging should increase consumers' psychological ownership for the product.

2.1.Packaging Transparency and Product Preference

Packaging is a "key marketing tool" (Krishna et al., 2017, p. 43). Packages vary on several dimensions (Ampuero & Vila, 2006), which have received varying amounts of attention by academic research. One dimension of great importance for brand and retail managers (e.g. Packaging World, 2024; The Food Institute, 2024), but which has received little scholarly attention, is packaging transparency. The limited prior research (see Table 1) has been published in different fields, and it yielded inconsistent evidence on whether and how transparent packaging affects product preference. Simmonds and colleagues investigated different aspects of packaging transparency. In a review article (Simmonds & Spence, 2017) and a book chapter (Simmonds & Spence, 2019), they reviewed the scarce and partly unpublished research on transparency and called for further investigation.

Simmonds et al. (2018b) explored the effect of packaging transparency in four product categories. In a within-subjects design, they found that transparency increased purchase intention of granola, chocolate, pasta and salmon. Though transparency improved the evaluation of all studied products, Simmonds et al. (2018b) observed different processes across products. The effect of packaging transparency on purchase intention was partially mediated by perceived attractiveness (for granola and chocolate), perceived tastiness (for granola and pasta), perceived freshness (for pasta) and perceived quality (for salmon). In short, while the specific processes differed across products, they always were due to differences in the perception of product features.

While Simmonds et al. (2018b) found a consistently positive effect of packaging transparency, Vilnai-Yavetz and Koren (2013) found the opposite. They reported a marginally significant decrease in purchase intentions for a chilled ready-to-eat meal.[1] They explained the negative effect on purchase intention by a decrease in packaging attractiveness and perceived product quality, again pointing to transparency-induced changes in packaging and product perceptions. Corroborating an effect via product information, Sabri et al. (2020) found that packaging transparency only increases purchase intention for a product high in quality risk (fresh soup) and not for a product low in quality risk (pasta).

Additionally, two other papers that focused on different phenomena also revealed effects of packaging transparency on product appeal. In their research on product unveiling, Patrick et al. (2017) manipulated packaging transparency in one study (Study 2). All participants ultimately saw the product (a blanket) fully, but conditions differed in the timing of visibility. Participants viewed either an opaque or a transparent box containing a blanket, which the experimenter then opened to unveil its contents. Despite (or because of) identical

[1] Vilnai-Yavetz and Koren (2013) report an effect of package transparency on purchase intention that was significant by a one-tailed test, $t(98) = 1.67$, $p < .05$. By the standard two-tailed test, $p = .10$.

final exposure, participants perceived the blanket as more pristine and therefore more valuable in the opaque condition than in the transparent condition. Morales and Fitzsimons (2007) investigated psychological contagion. In their Study 4, they showed that if cookies in an opaque packaging touched a product that was perceived to be disgusting, there was no contagion effect and the disgusting product did not affect participants' willingness to try the cookies. However, when the cookies were in a transparent package, touching the disgusting product diminished participants' willingness to try the cookies.

Overall, the evidence on whether packaging transparency improves product evaluation is equivocal. Although some processes have been explored, we still lack a clear understanding of why packaging transparency affects the evaluation of what lies within.

TABLE 1

OVERVIEW OF PRIOR ORIGINAL RESEARCH ON THE EFFECT OF PACKAGING TRANSPARENCY

Authors	Journal	Product(s)	DV	Process	Main findings
Deng and Srinivasan (2013)	Journal of Marketing	Cereals, candy, cookies, vegetables	Consumption	Monitoring, salience	For small, visually attractive foods and vegetables, packaging transparency increases food salience and thus consumption. For large foods, transparency facilitates consumption monitoring and thus decreases consumption.
Morales and Fitzsimons (2007) - Study 4	Journal of Marketing Research	Cookies, rice cake	Willingness to try	NA	If cookies in a transparent (an opaque) packaging touch a product that is perceived to be disgusting, there is a (no) contagion effect and the disgusting product reduces (does not affect) participants' willingness to try the cookies.
Patrick et al. (2017) – Study 2	International Journal of Research in Marketing	Blanket	Perceived value	Pristine beliefs	When a transparent (an opaque) packaging containing a blanket is opened, the blanket is perceived as less (more) pristine and of less (more) value.
Sabri et al. (2020)	Int. Journal of Retail & Distribution Management	Fresh milk, fresh soup, pasta	Purchase intention	Perceived quality	Transparency increase purchase intention via perceived quality for fresh milk and fresh soup (high perceived product risk), but not for pasta (low perceived product risk).
Simmonds et al. (2018b)	Food Quality and Preference	Granola, chocolate, pasta, salmon	Purchase intention	Perceived tastiness, freshness, quality, innovativeness, attractiveness	Transparency increases purchase intention of all tested products. The effect is partially mediated by perceived attractiveness (for granola and chocolate), perceived tastiness (for granola and pasta), perceived freshness (for pasta) and perceived quality (for salmon).
Vilnai-Yavetz and Koren (2013)	Int. Review of Retail, Distribution and Consumer Research	Chilled ready-to-eat meal	Purchase intention	Perceived instrumentality, perceived aesthetics, product quality	Transparency has a marginal negative effect on purchase intentions. The effect is mediated by packaging attractiveness and perceived product quality.

2.2.Packaging Transparency and the Reduction of a Barrier

The research we presented so far hints at two primary reasons why packaging transparency may affect preference for the contained product. First, just as material, shape or color of a package can affect its visual appeal (Reimann et al., 2010), packaging transparency can also affect the attractiveness of a packaged product (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). Second, transparent packaging can inform prospective consumers about the product in different ways. It can inform them about certain elements of its quality, such as size, freshness, color or consistency (Sabri et al., 2020; Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013) or about the remaining content in the packaging (Deng & Srinivasan, 2013). Both effects are dependent on the specific execution of the packaging design and the aesthetics and quality of the product contained. This helps explain why the evidence is mixed, but it does not provide us with clear and reliable insights beyond the specific contexts studied.

We suggest that in addition to the observed effects of packaging transparency, a more subtle underlying process may be at work. The starting point for this proposition is the fact that packaging essentially serves as a barrier between the product and the outside world, including other products, other potential contaminators and consumers (Szocs et al., 2021). Transparent packaging allows people to see what is inside and thus diminishes the psychological barrier between the product and the outside world while still protecting the product from contamination. As an industrial designer put it, “If you want to erase the barrier, you want people to see, don’t want to separate [the product and consumers], then you use transparent materials” (Cheng et al., 2018, p. 10).

This barrier-reducing function of transparent packaging helps explain why Morales and Fitzsimons (2007) found that people were less willing to try cookies in a transparent as opposed to opaque package that touched a disgusting product. They explain their findings by visual contamination of the product through packaging transparency. Transparency reduced the psychological barrier of the packaging and thus enabled contamination via outside influences.

If packaging transparency affects consumers because it reduces the barrier between the product and other products, then it is also likely to reduce the barrier between the product and the consumers. The removal of a visual barrier allows consumers to see and react to the object behind the barrier that would otherwise be hidden (Marquardt et al., 2015). This becomes clear when considering the way people behave when standing in front of a transparent wall. People blink when a ball is thrown at them, even if there is a glass wall in front of them that would stop the ball (Marquardt et al., 2015). If the same wall were opaque, such a protective blink would not happen even though the objective level of protection offered by the physical barrier remains unaltered. The same principle applies to transparent packaging. People still cannot touch the product directly, but they can see it, and they can react to it. Via this possibility for psychological interaction, consumers can develop some degree of intimate familiarity with the product (Cheng et al., 2018). Opaque packaging hinders this type of psychological interaction between a consumer and what is inside the packaging. In fact, research on the effect of packaging transparency on snacking behavior suggests that transparency can affect food consumption via both a monitoring and a salience function (Deng & Srinivasan, 2013). The monitoring function provides objective information about what has been consumed, i.e. how the consumer has been interacting with the product. The salience function amounts to more than the provision of actual information or a change in the package’s appearance. It reflects the fact that allowing consumers to glimpse the product also allows consumers to better connect with what lies within.

2.3. Packaging Transparency and Psychological Ownership

Building on the barrier-removing qualities of packaging transparency, we propose that people develop stronger feelings of ownership for products in transparent packaging compared to equivalent opaque packages. Psychological ownership represents a special type of relationship that individuals develop towards target objects (Peck et al., 2020; Pierce et al., 2003) that are at least somewhat desirable, claimable and non-fungible (Kamleitner & Mitchell, 2018; Pierce et al., 2003). It is a state "in which individuals feel as though the target of ownership or a piece of that target is 'theirs' (i.e., 'It is mine!')" (Pierce et al., 2003, p. 86) and has been found to reliably predict preference across diverse contexts (Morewedge et al., 2021; Peck & Luangrath, 2023). Experiencing psychological ownership for different targets enables consumers to satisfy multiple psychological motives, including feeling effective, shaping one's identity and establishing a sense of home (Peck & Luangrath, 2023; Pierce et al., 2003).

Psychological ownership is a consciously experienced state that develops through actual, perceived or even purely imagined interactions with a target (Liu, 2023). It can emerge for objects to which consumers do not hold any legal rights (Kamleitner & Feuchtl, 2015; Peck et al., 2013) or for targets that cannot be owned such as nature (Peck et al., 2020). Three experiential routes (Pierce et al., 2001), whether actual or imagined, facilitate the emergence of psychological ownership: perceived intimate knowledge, perceived control, and perceived self-investment. These experiences frequently overlap in practice, and even minor variations in their intensity can significantly influence subsequent behavior (Kamleitner & Mitchell, 2018; Morewedge et al., 2021; Peck & Luangrath, 2023).

By reducing the barrier between product and consumer, packaging transparency is prone to invite the experiences known to trigger psychological ownership. Research on product design suggests that transparency "can enrich consumers' sensorial experience […], by appreciating the inside contents, and by decreasing the psychological distance between products and consumers" (Cheng et al., 2018, p. 9). In fact, when objects disclose their meaning, nature or essence (Baxter et al., 2015), become psychologically closer (Ruzeviciute et al., 2020) and allow consumers to discover them (Kokkoris et al., 2020), they tend to become more psychologically appropriated. Transparency reduces the barrier between a product and a consumer and invites product discovery. An enhanced opportunity for consumers to interact with and become intimate with a target facilitates its psychological appropriation (Bagga et al., 2019; Jami et al., 2020; Peck et al., 2020; Rouse, 2020). Viewing the actual product through transparent packaging or a transparent window provides richer information and is prone to create a sense of more intimately knowing the authentic product. This visibility may also trigger an enhanced sense of control as consumers can observe how the product responds to their handling, while simultaneously inviting interaction that constitutes investments of attention and effort.

We suggest that this amounts to the facilitation of all three experiential routes known to enhance psychological ownership. We therefore argue that packaging transparency can increase psychological ownership and, in turn, enhance product preference.

3. HYPOTHESES AND OVERVIEW OF STUDIES

Several hypotheses follow this theoretical rationale. Because psychological ownership increases preference for (e.g. Brasel & Gips, 2014; Peck & Shu, 2009; Reb & Connolly, 2007) and valuation of (Asatryan & Oh, 2008; Lee et al., 2013; Shu & Peck, 2011; Thürridl et al., 2020) the psychologically owned, we predict that packaging transparency will improve product preference.

H1: Packaging transparency improves product preference.

H2: The positive effect of packaging transparency on product preference is mediated by psychological ownership.

Notably, we predict that this holds even if we control for the visual appeal of the package, and the additional information that transparency may provide. This is an important theoretical qualification because it ensures that the predictive value of psychological ownership goes beyond the effects that transparency may have on perceptions of the product or package itself. In particular, it is important to ensure that an enhanced preference for a transparently packaged good cannot be reduced to the superior objective information about the product that packaging affords. While objective knowledge facilitates intimate knowledge, intimate knowledge differs by encompassing feelings of association and familiarity that may accrue even in the absence of increased objective knowledge (Pierce et al., 2001).

Additionally, if psychological ownership is a crucial predictor of the effect of packaging transparency's effect on preference, we would expect to observe boundary conditions related to consumers' motivation for psychological ownership. This motivation varies across both target characteristics and contextual factors. We propose moderators relating to both sources of motivational variation.

First, consumers do not wish to psychologically appropriate all products. Specifically, consumers actively avoid psychologically connecting themselves to products characterized by low desirability (Kamleitner & Mitchell, 2018; Pierce et al., 2003). Lack of desirability can manifest through various product attributes, including visual attractiveness. Research on disgust (Cole et al., 2013; van Dijke et al., 2018) suggests that consumers have little inclination to appropriate ugly or disgusting products. We expect that transparent packaging cannot overcome this fundamental barrier and thus predict that:

H3: The positive effect of packaging transparency on product preference is attenuated when the product is low in desirability.

Second, if the proposed positive effect of transparency unfolds via psychological ownership, it should also attenuate in response to contextual differences in ownership motivation. In particular, transparency should not enhance product preference when ownership is not expected, such as when consumers buy the product for someone else (Tari & Trudel, 2024). In case of buying for someone else, differences across conditions cannot be attributed to changes in the product's or the package's visual attractiveness, nor to an increase in information from transparency. This proposition is thus unique to our proposed process of psychological ownership and provides a relevant test of our theorizing.

H4: The positive effect of packaging transparency on product preference is attenuated when consumers do not expect to own the product themselves.

We tested our hypotheses across seven studies. Two additional studies are provided in the Web Appendix. Table 2 summarizes the studies and their main findings. Studies 1a and 1b show the effect of packaging transparency on product preference (H1) in incentive compatible settings. Study 2 further tested H1 for a product that is essentially a commodity, and hence for which visual inspection provides virtually no information: ground cinnamon. We show that the effect holds, and therefore the effect cannot be fully explained by information provided by a transparent packaging. Moreover, addressing an important consideration in retail settings, Study 2 demonstrated this effect under both joint and separate presentation of packages with and without transparent windows.

TABLE 2

SUMMARY OF ALL STUDIES AND MAIN FINDINGS

Study 1a: Demonstration of effect through consequential choice (*N* = 210, lab study)				
	Transparent		Opaque	
Choice	61%		39%	
Main finding: Consumers prefer cookies from a packaging with a transparent window to cookies from an opaque packaging.				
Study 1b: Demonstration of effect through consequential choice (N = 382, lab study)				
	Transparent		Opaque	
Choice	80%		20%	
Main finding: Consumers prefer a pouch of gummy bears with a transparent window to an opaque pouch of gummy bears.				
Study 2: Low informativity and role of presentation (*N* = 802, Prolific)				
	Joint Presentation		Separate Presentation	
	Transparent	Opaque	Transparent	Opaque
Purchase Intention	5.02 (1.34)	4.63 (1.45)	4.80 (1.61)	4.52 (1.74)
Main finding: Transparency increases purchase intention of cinnamon, a product for which visual inspection provides virtually no information. There is no effect of presentation type.				
Study 3a: Demonstration of process (*N* = 265, lab study)				
	Transparent		Opaque	
Purchase Intention	2.22 (1.49)		1.91 (1.19)	
Psychological Ownership	2.58 (1.83)		2.09 (1.49)	
Main finding: Psychological ownership mediates the effect of transparency on purchase intention of a mug.				
Study 3b: Testing alternative processes (*N* = 77, lab study)				
	Transparent		Opaque	
Purchase Intention	5.02 (1.40)		3.57 (1.75)	
Psychological Ownership	3.24 (1.87)		1.89 (1.17)	
Packaging Attractiveness	5.15 (1.13)		3.08 (1.50)	
Packaging Informativity	5.41 (1.12)		4.42 (1.40)	
Main finding: Transparency increases purchase intention of muesli, psychological ownership, packaging attractiveness and informativity. Only psychological ownership mediates the effect of transparency on purchase intention.				
Study 4: Role of product (*N* = 220, lab study)				
	Trail Mix (desirable)		Vegetable Stew (undesirable)	
	Transparent	Opaque	Transparent	Opaque
Purchase Intention	3.84 (1.69)	3.01 (1.49)	3.01 (1.63)	3.12 (1.54)
Main finding: Transparency increases purchase intention of a desirable but not purchase intention of an undesirable product.				
Study 5: Role of recipient (*N* = 201, Prolific)				
	Self		Other	
	Transparent	Opaque	Transparent	Opaque
Choice	78%	22%	55%	45%
Main finding: The positive effect of transparency on choice of cookies is mitigated when the product is bought for someone else and not for oneself.				

Studies 3a and 3b demonstrate that psychological ownership mediates the effect of packaging transparency on product preference (H2). Although most of our empirical evidence is based on food products where transparency is a particularly relevant packaging element, Study 3a provides initial evidence that the effect also holds for a non-food product, i.e. a mug. Moreover, in Study 3a the opaque and transparent packages were matched for visual appeal, perceived manufacturing effort, and perceived quality and luxuriousness, thereby excluding those factors as potential explanations of the effect. Study 3b rules out two features of the packaging, i.e. attractiveness and informativity, as potential mediators.

In Study 4, we contrasted a desirable product (trail mix) with an undesirable product (vegetable stew) and show that the effect of packaging transparency on product preference does not extend to products that consumers are not motivated to psychologically own (H3). Moreover, while the previous studies used packaging with transparent windows, Study 4 used a transparent glass jar, where only label and lid hid parts of the product. In Study 5, we show that the effect of transparency does not hold when consumers are not motivated to psychologically own the product because they do not expect ownership, i.e. when they buy the cookies for someone else (H4).

To ensure that the proposed effect is robust to the measures employed, we used different samples, study settings and measures. We assessed product preference by measuring choice between products in different packages (Studies 1a, 1b, 5) and by employing different measures of purchase intention (Studies 2, 3a, 3b, 4). We conducted our studies in the lab (Studies 1a, 1b, 3a, 3b, 4) and online via Prolific (Studies 2, 5). Sample size was determined by a priori power analyses. In the lab studies, we were bound by the number of students attending the experimental sessions. Five of the seven studies in our main text are preregistered. In all studies, we report all measures, conditions, and data exclusions. All stimulus material, data and preregistrations are provided here: https://osf.io/x7av8/?view_only=63d2d0a1c30d4a59ba252858bd5bff07

4. STUDIES 1A AND 1B: INCENTIVE-COMPATIBLE DEMONSTRATION OF THE EFFECT

Studies 1a and 1b investigated the effect of packaging transparency on incentive-compatible choice of chocolate cookies (Study 1a) and gummy bears (Study 1b). We predicted that consumers would choose the product in transparent packaging (H1). Both studies were preregistered (1a: https://aspredicted.org/y932k.pdf, 1b: https://aspredicted.org/hsxx-s7qj.pdf).

4.1.Participants, Design, and Procedure

A priori power analysis using G*Power version 3.1.9.7 indicated that the required sample size to achieve 80% power for detecting a small to medium effect (w = .20) with α = .05 is N = 197 for χ^2 tests. In Study 1a, 210 undergraduates (female = 54%, M_{age} = 21.3) participated in a lab study in return for partial course credit and a cookie. In Study 1b, 382 undergraduates (female = 54%, M_{age} = 21.1) participated in a lab study for partial course credit and the chance to win a pouch of gummy bears.

Participants in Study 1a were shown pictures of one red and one blue package of cookies, one featuring a transparent window and one that was opaque. We counterbalanced across participants whether the red or the blue package featured the window (see Figure 1). All packages were clearly labeled as containing chocolate cookies. Participants were asked to choose from which of the two packages they would like to receive their cookie. At the end of the lab session, students received their chosen cookie.

FIGURE 1

STIMULUS MATERIALS OF ALL STUDIES

Study 1a and Study 5

Study 1b

Study 2

(Target) (Decoy)

Study 3a **Study 3b**

Study 4

Participants in Study 1b were shown pictures of two pouches of gummy bears with different brand names and labels (see Figure 1). One package featured a transparent window while the other was opaque. We again counterbalanced across participants which brand had the window, and all packages were clearly labeled as containing gummy bears. Participants were informed that they could enter a raffle to win one of the packages, and were asked which package of gummy bears they would like to win. At the end of the study, we also assessed how much participants like gummy bears, using a single item with a 5-point scale. With a mean of 3.91, liking was high. At the conclusion of the study, the raffle was conducted, and the winners were informed and handed their chosen bag of gummy bears.

4.2.Results and Discussion

As predicted, in Study 1a, participants were significantly more likely to choose a cookie from a transparent package (61%) than from an opaque package (39%; χ^2 (1) = 10.08, p = .002, phi = .22). Similarly, in Study 1b, participants were significantly more likely to choose the transparent package of gummy bears (80%) than the opaque package (20%; χ^2 (1) = 140.90, p < .001, phi = .61). Studies 1a and 1b provide evidence that consumers prefer products in transparent packaging (H1). However, both chocolate cookies and gummy bears could benefit from visual inspection, as this provides additional information about the product (e.g., whether the cookies contain chocolate chips, or how large and what color the gummy bears are). In Study 2, we chose a product for which visual inspection provides little to no additional information: ground cinnamon.

5. STUDY 2: LOW INFORMATIVITY AND ROLE OF PRESENTATION

Study 2 (preregistered at https://aspredicted.org/4pj9-rkjb.pdf) tested whether transparent packaging increases preference (H1) for a commodity product: ground cinnamon. We selected this product because it contrasts with the previous products in theoretically informative ways, enabling us to rule out alternative explanations. First, visual inspection of ground cinnamon provides minimal information (see pretest below), allowing us to rule out enhanced informativity as the sole driver of the effect. Second, unlike gummy bears and cookies, viewing ground cinnamon is unlikely to trigger immediate visceral cravings (Ditto et al., 2006; Loewenstein, 1996). By generalizing the effect to ground cinnamon, we can rule out the possibility that our findings simply reflect increased cravings triggered by increased product salience through transparency.

Moreover, we tested the robustness of H1 by investigating whether the preference for a transparently packaged good persists under different presentation conditions. A *separate presentation condition* provides a pure test of H1. In this condition, participants viewed and evaluated only a single package, either opaque or transparent, and reported their purchase intention for that product alone (see target product in Figure 1).

A *joint presentation condition* provides a test of H1 in a more ecologically valid setting. In real markets, products are rarely considered in isolation. Rather, products are typically displayed on webpages or shelves alongside other products, some in opaque packages and others in transparent packages. In the *joint presentation* condition, participants viewed either the opaque or the transparent version of the target product alongside a contrasting decoy product (see Figure 1). When the target product was in opaque packaging, the decoy appeared in transparent packaging and vice versa. This setup resembled realistic market environments where both opaque and transparent packages coexist.

Crucially, regardless of presentation condition, participants only reported purchase intentions for the target product, ensuring a fully between-subjects design while varying the presentation format (separate vs. joint).

5.1.Product Pretest

In a pretest (N = 100), we assessed how informative it is to visually examine ground cinnamon via two items (*I learn a lot about the product by looking at it*, *I need to see this product to know what I will get*) on a scale from 1 (strongly disagree) to 7 (strongly agree). In addition to cinnamon, we included the food products of all studies (see Web Appendix for all results). Each respondent evaluated all products (order randomized), and we averaged the two items per product. Viewing ground cinnamon (M = 3.33, SD = 1.79) was perceived to provide only little information, significantly below the neutral scale midpoint ($t(99) = 3.75$, $p < .001$, $d = 0.38$).

5.2.Participants, Design, and Procedure

Eight hundred two US Prolific panelists (female = 52%, M_{age} = 41.2) were randomly assigned to one of four conditions of a 2 (package: opaque vs. transparent) × 2 (presentation: joint vs. separate) between-subjects design. A priori power analysis (G*Power version 3.1.9.7) indicated that the required sample size to achieve 80% power for detecting a small to medium effect (w = .20) with $\alpha = .05$ is N = 199 for a two-way ANOVA. Given the online setting, we had the opportunity to recruit a larger sample to gain additional power.

In the separate presentation condition, the target package (transparent or opaque) was shown alone. In the joint presentation condition, the target transparent (opaque) package was presented next to an opaque (transparent) decoy package from a different brand. Participants then rated their purchase intention via three items (*I would buy this cinnamon if I happened to see it in a store*, *I would actively seek out this cinnamon*, *I would try this cinnamon*, $\alpha = .91$). All participants only rated the target product.

5.3.Results and Discussion

As predicted, a 2 (package: opaque vs. transparent) × 2 (presentation: joint vs. separate) ANOVA indicated a significant main effect of package ($F(1, 798) = 9.58$, $p = .002$, $d = 0.22$), with higher purchase intentions for the transparent package (M = 4.91, SD = 1.48) than for the opaque package (M = 4.57, SD = 1.61). There was neither a main effect of presentation ($F(1, 798) = 2.33$, $p = .127$) nor an interaction effect between package and presentation ($F(1, 798) = 0.23$, $p = .631$). Independent t-tests showed that transparency had a highly significant effect on purchase intention in the joint setting ($t(398) = 2.79$, $p = .006$, $d = 0.28$) and only a marginally significant effect in the separate presentation conditions ($t(400) = 1.71$, $p = .089$, $d = 0.17$).

These results support H1 in a category for which viewing the product is uninformative (i.e., ground cinnamon) and unlikely to trigger impulsive consumption desires, thereby suggesting that neither informativity nor visceral cravings can fully explain the effect. The lack of interaction with presentation condition suggests that the effect of transparency is of similar magnitude across both settings. However, the marginal effect of transparency in the separate presentation condition leaves open the question of whether the transparency effect emerges reliably when the package is presented in isolation. Studies 3a, 3b, and 4 therefore provide further tests of the transparency effect in separate presentation. Moreover, Studies 3a and 3b will dive deeper into the proposed underlying process.

6. STUDY 3A: DEMONSTRATION OF PROCESS

Study 3a (preregistered at https://aspredicted.org/ntmj-d78x.pdf) tested whether psychological ownership underlies the positive effect of transparent packaging on product attitudes. We presented a mug in either opaque or transparent packaging (see Figure 1), and participants reported their purchase intentions and psychological ownership of the mug. We predicted that purchase intentions for the mug would be higher in its transparent package than

in its opaque package (H1), and that this effect would be mediated by psychological ownership (H2).

Several aspects of the product and package were theoretically informative. First, whereas our prior studies used food products (i.e., chocolate cookies, gummy bears, and ground cinnamon), Study 3a instead used a non-food product (i.e., a mug). This was important because foods are unique in that they are ingested. Bodily consumption may render health-related concerns such as freshness more salient. Thus, it is plausible that consumers may prefer transparent packages for foods, but not for non-food products. The use of a mug in Study 3a therefore provides a first test of the effect's generality.

Second, the nature of the transparency also differed. Whereas our prior studies used a plastic window, transparency in Study 3a consisted of a cut-out in the packaging which yielded an open window. Such open windows differ in important respects from plastic windows. On one hand, by using no material (and especially no plastic), open windows are more environmentally sustainable, which in turn could increase product preference even more (see Sokolova et al., 2023). On the other hand, open windows are more susceptible to both physical and psychological contamination, which could instead reduce product preference (e.g. White et al., 2016). Thus, competing psychological factors render the likely impact of an open window uncertain, making Study 3a another critical test of the effect's generality.

Third, we designed the package to reduce the informativity benefit of packaging transparency. Specifically, by showing an illustration of the mug directly on the package, we limited the utility of visual inspection of the product itself, again testing the effect of package transparency under conditions of low informativity. If psychological ownership contributes to this effect, as we argue, then it should occur even when the transparency provides little or no information (see also Study 2). Alternatively, if the effect were solely due to seeing what the product looks like, then simply showing the product on the package should eliminate the effect.

Finally, we also matched the opaque and transparent packages on several other properties that might explain or contribute to the effect. Most simply, transparency could increase purchase intentions by rendering the package more visually appealing (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). Alternatively or additionally, transparent packaging may be perceived as requiring more effort from the manufacturer due to its more complex design, which can trigger an "effort heuristic" (Kruger et al., 2004) whereby consumers infer higher quality or greater luxury. We therefore measured all these packaging perceptions in a pretest, with the aim of matching the opaque and transparent packages on these properties, thereby ruling them out as alternative explanations of the effect.

6.1.Packaging Pretest

We conducted a pretest (N = 76) in which students were randomly assigned to see a picture of a carton box with a mug inside, either opaque or with an open window (see Figure 1). Both boxes featured an illustration of the mug. Participants evaluated the product's quality (*This mug is of high quality*) and luxuriousness (*This mug is luxurious*), the perceived effort that went into the packaging (*A lot of effort went into the packaging of this product*), and the packaging's appeal (*The packaging of this product is appealing)*. Items were presented in random order and rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Independent *t*-tests indicated no difference between the opaque and transparent packaging in perceived product quality ($t(74) = 0.29$, $p = .775$), luxuriousness ($t(74) = 0.04$, $p = .969$), packaging effort ($t(74) = 1.08$, $p = .283$), or packaging appeal ($t(74) = 1.18$, $p = .242$).

6.2.Participants, Design, and Procedure

Three hundred eleven undergraduates participated in a lab session for partial course credit. According to a simulation study of statistical power in mediation analysis (Fritz and

MacKinnon (2007), a sample size of 148 is required to achieve 80% power to detect small to medium effects for both a and b paths in bias-corrected bootstrap mediation models. The sample size of 311 is due to unpredictable lab participation.

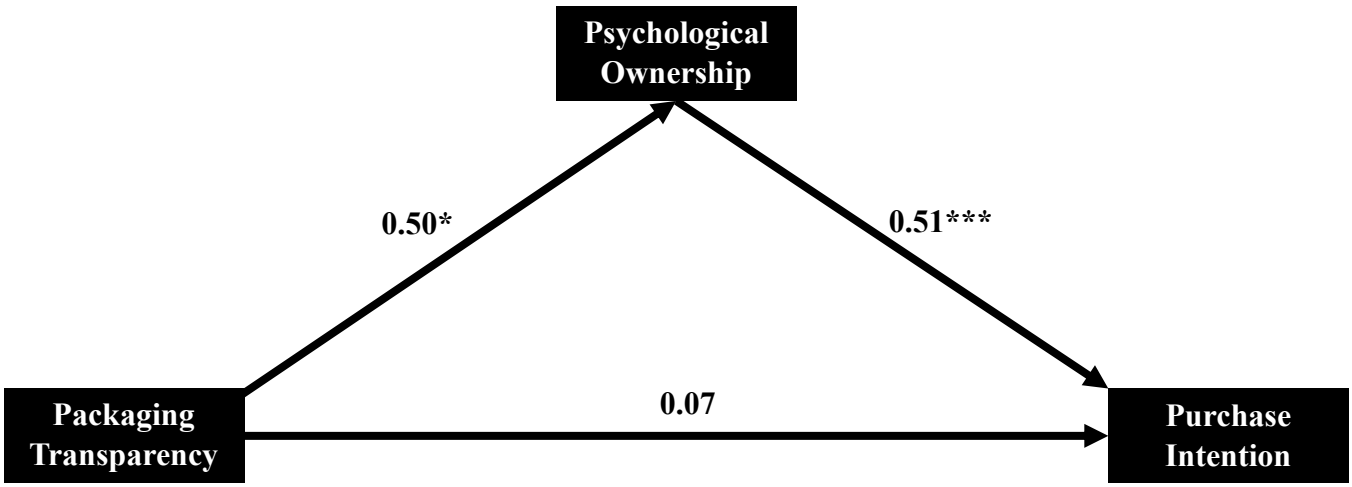
Participants were randomly assigned to see, on a screen, the picture of either an opaque or a transparent box containing a mug (Figure 1). Respondents rated their purchase intention via the first two items from Study 2 (α = .74) and their psychological ownership via three items (*It feels a bit as if this mug was mine; I feel some degree of personal ownership for this mug; It feels a bit like I own this mug*; α = .95) adapted from Peck and Shu (2009). All items were rated on a scale from 1 (strongly disagree) to 7 (strongly agree), and the order of the two variables was randomized. As a manipulation check, at the end of the study, we asked participants whether the box they evaluated had a window or not. Forty-six students failed this manipulation check, so as preregistered, they were excluded from analyses, resulting in a final sample size of 265 (female = 60%, M_{age} = 21.4).

6.3.Results and Discussion

As predicted, packaging transparency increased both purchase intention (see Table 2; $t(263) = 1.92$, $p = .056$, $d = 0.24$) and psychological ownership ($t(263) = 2.42$, $p = .016$, $d = 0.30$). Purchase intention and psychological ownership correlated significantly ($r = .63$, $p < .001$). As recommended by Pieters (2017), we conducted confirmatory factor analysis including the items of purchase intention and psychological ownership. The results supported discriminant validity: Their squared correlation was 0.40, and the average variance extracted was 0.81 for psychological ownership and 0.71 for purchase intention. We therefore conducted a bootstrap mediation analysis (Hayes, 2013) with package transparency as independent variable (0 = opaque, 1 = transparent), psychological ownership as mediator, and purchase intention as dependent variable. As shown in Figure 2, the positive effect of package transparency on purchase intention was mediated by psychological ownership (indirect effect: $B = 0.25$, CI_{95} [0.04, 0.47]). The direct effect was nonsignificant ($B = 0.07$, CI_{95} [-0.19, 0.32]).

FIGURE 2

MEDIATION ANALYSIS, STUDY 3A



NOTE. - * p < .05; *** p < .001.

Study 3a demonstrated that, relative to an opaque package, a transparent packaging increased purchase intentions (H1), and this effect was mediated by psychological ownership (H2). These results show that the effect holds across several relevant conditions: (i) The

product was a non-food product, (ii) the package window was an open cut-out one rather than a plastic one, (iii) the window was only minimally informative, because the product was illustrated on the outside of the package, and (iv) the opaque and transparent packages were matched for visual appeal, perceived manufacturing effort, and perceived quality and luxuriousness, thereby excluding those factors as sole alternative explanations of the effect.

To ensure that the proposed mediation also holds for food products, we replicated this study with the blue package of chocolate cookies from Study 1a (see the Web Study 1 in the Web Appendix).

7. STUDY 3B: TESTING ALTERNATIVE PROCESSES

Study 3a addressed visual appeal and informativity (as well as the effort heuristic) by matching those properties across the opaque and transparent packages. That approach allowed us to isolate psychological ownership as a potential mechanism of the effect, with visual appeal and informativity essentially held constant across packages. Although such an approach provides a pure test of our proposed mechanism, it is relatively low in ecological validity, because in real markets a transparent package is likely to be informative of the product inside, and may also be more attractive than an opaque package (Cheng et al., 2018; Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013).

Therefore, in Study 3b, we allowed visual appeal and informativity to vary naturally, and tested whether psychological ownership contributes to the positive effect of packaging transparency on purchase intentions above and beyond any effects of visual appeal and informativity. We hypothesized that psychological ownership mediates the effect of packaging transparency on product preference (H2), even after statistically controlling for attractiveness and informativity.

7.1.Participants, Design, and Procedure

Seventy-seven undergraduates (female = 71%, M_{age} = 21.9) participated in a lab session for partial course credit. According to a simulation study of statistical power in mediation analysis (Fritz & MacKinnon, 2007), a sample size of 148 is required to achieve 80% power to detect small to medium effects for both a and b paths in bias-corrected bootstrap mediation models. The final sample size of 77 was adequate for detecting medium effects and reflected the unpredictability of lab participation and the use of physical stimulus material.

Participants evaluated a package of muesli either with or without a transparent window. In this study, we used a physical product package (rather than a picture of one) that we designed based on a package available on the market. Both the opaque and the transparent package feature a photo of muesli (see Figure 1). The package was placed on a table in the lab for students to view. Participants reported their purchase intention with three items on a 7-point scale (*I am tempted to try this product; I think I would like this product; I am interested in buying this product*; α = .93). We used brief 7-point bipolar items to assess psychological ownership (*I feel like this package of muesli is: A muesli - MY muesli*; Thürridl et al. (2020)), package attractiveness (*This package is attractive*), and package informativity (*This package is informative*).

7.2.Results and Discussion

Transparency affected all measured variables (see Table 2). The transparent package elicited higher purchase intentions ($t(75) = 4.01$, $p < .001$, $d = 0.92$) and higher psychological ownership ($t(75) = 3.76$, $p < .001$, $d = 0.86$) than the opaque package. The transparent packaging was also perceived as more attractive ($t(75) = 6.86$, $p < .001$, $d = 1.57$) and more informative ($t(75) = 3.47$, $p < .001$, $d = 0.79$). Correlations among the three process measures and the dependent variable are reported in Table 3. The significant but moderate correlations

of the presumed mediators with the dependent variable suggest sufficient discriminant validity for meaningful mediation (see Pieters, 2017).

TABLE 3

CORRELATIONS, STUDY 3B

	1	2	3	4
1. Packaging Attractiveness	—			
2. Packaging Informativity	.56***	—		
3. Psychological Ownership	.35**	.24*	—	
4. Purchase Intention	.45***	.37**	.50***	—

NOTE. - * p < .05; ** p < .01; *** p < .001.

We conducted a mediation analysis (Hayes, 2013) with packaging transparency as independent variable (0 = opaque, 1 = transparent), psychological ownership as mediator, and purchase intention as dependent variable. As in Study 3a, psychological ownership mediated the effect of package transparency on purchase intention (indirect effect: B = 0.54, CI_{95} [0.22, 0.90]). The direct effect was also significant (B = 0.90, CI_{95} [0.18, 1.62]).

Next, we ran two additional mediation analyses, one with packaging attractiveness as the sole mediator and another with packaging informativity as the sole mediator. Replicating previous findings (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013), we found mediation via both packaging informativity (indirect effect: B = 0.32, CI_{95} [0.03, 0.80], direct effect: B = 1.12, CI_{95} [0.37, 1.88]) and packaging attractiveness (indirect effect: B = 0.64, CI_{95} [0.03, 1.36], direct effect: B = 0.80, CI_{95} [-0.08, 1.69]). That is, when included in separate analyses as the sole mediator, all three process measures significantly mediated the effect.

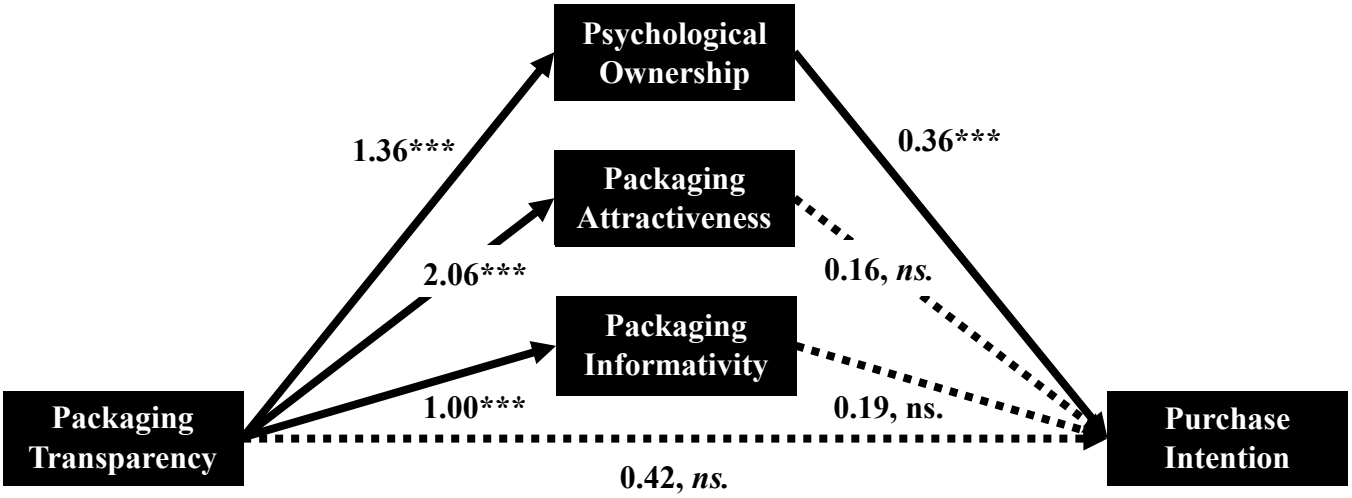
To explore each process measure's unique contribution to the effect, we also conducted a mediation analysis (Hayes, 2013) with all three measures (i.e., psychological ownership, visual attractiveness, informativity) included simultaneously as parallel mediators. Results are illustrated in Figure 3. Only the indirect effect via psychological ownership was significant (B = 0.49, CI_{95} [0.19, 0.86]). The transparency effect was no longer mediated by package attractiveness (CI_{95} [-0.36, 1.05]) or informativity (CI_{95} [-0.12, 0.69]), and no significant direct effect remained (CI_{95} [-0.43, 1.27]). Psychological ownership also continued to mediate the effect (CI_{95} [0.004, 0.77]) when attractiveness and informativity were included as covariates rather than parallel mediators.[2]

Study 3b sheds light on the process explaining how packaging transparency affects product preference. Transparency had a positive effect on three potential processes, i.e. psychological ownership, package attractiveness, and package informativity. However, despite acceptable discriminant validity among the measures, only psychological ownership reliably mediated the effect of packaging transparency on product preference, thus supporting H2.

[2] Moreover, when only psychological ownership and visual attractiveness were included as parallel mediators, only psychological ownership mediated the effect (indirect effect: B = 0.50, CI_{95} [0.18, 0.87], direct effect: B = 0.44, CI_{95} [-0.42, 1.29]). And when only psychological ownership and visual informativity were included as parallel mediators, again only psychological ownership mediated the effect (indirect effect: B = 0.51, CI_{95} [0.21, 0.86], direct effect: B = 0.27, CI_{95} [-0.03, 0.70]).

FIGURE 3

PARALLEL MEDIATION ANALYSIS, STUDY 3B



NOTE. - *** p < .001.

8. STUDY 4: ROLE OF PRODUCT

So far, we have shown that packaging transparency has a positive effect on product preference, and that this effect is at least partially driven by an increase in psychological ownership for the product. We showed this underlying psychological process through measured mediation in Studies 3a and 3b and addressed its theoretical plausibility by ruling out some alternative accounts via the choice of product and package in Studies 2 and 3a. In Study 4, we test for a boundary condition implied by this psychological process. Psychological ownership is a condition that consumers are consciously aware of (Peck & Luangrath, 2023) and are capable of avoiding. Specifically, consumers are prone to avoid psychological appropriation of products that are undesirable (Kamleitner & Mitchell, 2018). People tend to distance themselves from products that are unappealing and elicit disgust (Cole et al., 2013; van Dijke et al., 2018), thereby also avoiding psychological appropriation (Pierce et al., 2003). Study 4 (preregistered at https://aspredicted.org/r76r-6cbp.pdf) therefore tested whether the preference for products in transparent packaging is reduced when the product lacks desirability due to its unappealing appearance. As our desirable and undesirable products, we chose respectively trail mix and vegetable stew (confirmed in a pretest reported below). In addition to using new product stimuli, we also used another ecologically valid version of product transparency. Participants viewed one or the other product in either an opaque or transparent glass jar. We predicted that the transparency effect would be larger for trail mix (desirable product) than for vegetable stew (undesirable product).

8.1.Product Desirability Pretest

We conducted a pretest (N = 100) in which participants were shown a transparent jar of either vegetable stew or trail mix. We used real product photos and digitally altered them using ChatGPT. The vegetable stew was edited to appear less visually appealing, whereas the trail mix was edited to appear more appealing. Participants evaluated the products on four 7-point bipolar scales (*not at all appealing – very appealing, not at all ugly – very ugly, not at all disgusting – very disgusting, not at all desirable – very desirable*). We reverse scored the ugly and disgusting item and averaged all items (α = .96). As expected, trail mix scored higher than vegetable stew (M_{trail} = 5.24, SD = 1.45; M_{stew} = 3.44, SD = 1.88; t(98) = 5.35, p <

.001, d = 1.07). Trail mix is significantly above the scale midpoint ($t(50) = 6.09$, $p < .001$, d = 0.85) and vegetable stew below ($t(48) = 2.07$, $p = .044$, $d = 0.30$). This indicates that vegetable stew is a rather undesirable and unappealing product, while trail mix is desirable and appealing.

8.2.Participants, Design, and Procedure

Two hundred twenty-two undergraduates (female = 53%, $M_{age} = 21.4$) participated in a lab session for partial course credit. A priori power analysis (G*Power version 3.1.9.7) indicated that the required sample size to achieve 80% power for detecting a small to medium effect ($w = .20$) with $\alpha = .05$ is $N = 199$ for a two-way ANOVA.

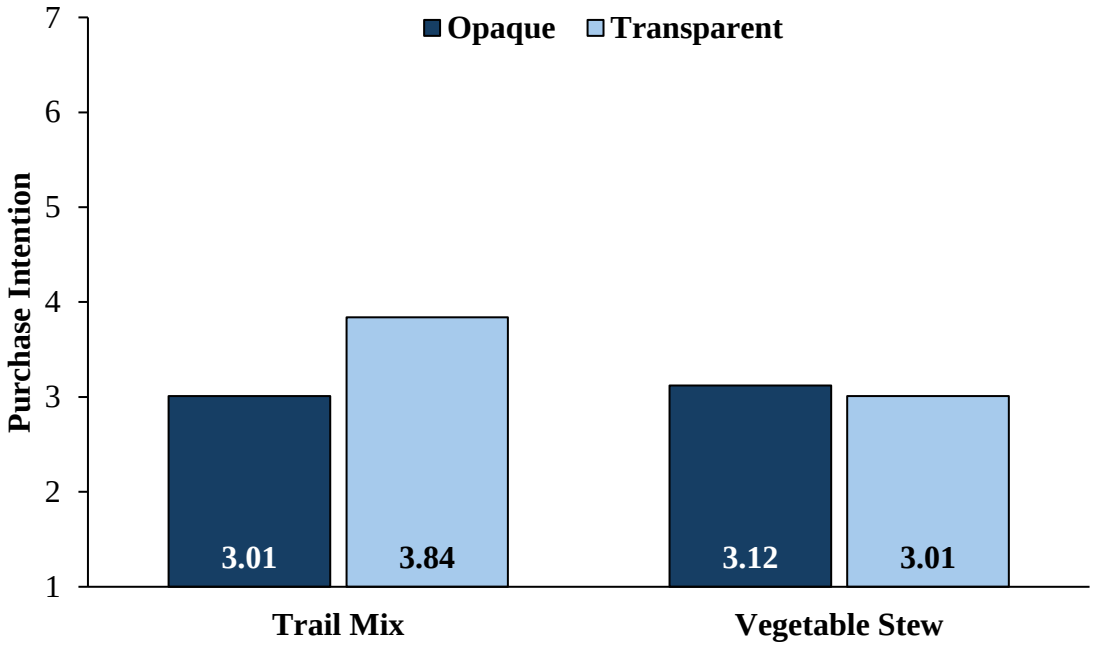
Participants were randomly assigned to one of the four conditions of the 2 (package: opaque vs. transparent) × 2 (product: trail mix vs. vegetable stew) between-subjects design. They evaluated a jar of either trail mix or vegetable stew that was either opaque or transparent (except for the label and the lid; see Figure 1) on a screen. Participants viewed the respective product for at least 5 seconds (controlled by a timer), and then reported their purchase intention via the same three items as in Study 3b ($\alpha = .87$).

8.3.Results and Discussion

Results are illustrated in Figure 4. A 2 (packaging: opaque vs. transparent) × 2 (product: trail mix vs. vegetable stew) ANOVA indicated that both the main effects of product ($F(1, 216) = 2.83$, $p = .094$) and package ($F(1, 216) = 2.83$, $p = .094$) were marginally significant. More importantly, as predicted, the interaction was significant ($F(1, 216) = 4.84$, $p = .029$, $d = 1.06$). Separate independent t-tests showed that transparency significantly increased purchase intention for the trail mix ($t(103) = 2.69$, $p = .008$, $d = 0.53$), but not for the vegetable stew ($t(113) = 0.38$, $p = .707$).

FIGURE 4

PURCHASE INTENTIONS, STUDY 4



Study 4 introduces an important boundary condition. The positive effect of packaging transparency does not hold for products that are not desirable. In the present study, vegetable

stew was less desirable than trail mix. Accordingly, transparent packaging increased purchase intentions for trail mix, but not for vegetable stew. This result supports H3. Moreover, whereas the stimuli in our previous studies used transparent windows in otherwise opaque packages, this study used glass jars which were transparent aside from the label and the lid.

9. STUDY 5: ROLE OF RECIPIENT

In Study 5, we introduce another boundary condition. The possibility of ownership is necessary for the emergence of psychological ownership (Atasoy & Morewedge, 2018; Peck & Luangrath, 2023; Tari & Trudel, 2024). Therefore, if the effect of packaging transparency on product preference is driven by psychological ownership, it should be attenuated when there is no expected ownership (H4). When choosing a product for oneself, the consumer will be the ultimate owner of the product. They are thus likely to strive for psychological ownership also (Rudmin & Berry, 1987). When choosing a product for someone else, however, the consumer only takes temporary ownership of the product, and hence is not motivated to psychologically own the product (Tari & Trudel, 2024). In Study 5, we therefore manipulate expected ownership (choosing a product for oneself vs. for someone else) and investigate whether it affects the choice between an opaque and a transparent package. Should we find the expected difference in effect across conditions, it would deliver evidence for the practical relevance and conceptual uniqueness of our psychological ownership account.

9.1.Participants, Design, and Procedure

Two hundred one US Prolific panelists (female = 65%, M_{age} = 35.6) participated in the study. A priori power analysis using G*Power version 3.1.9.7 indicated that the required sample size to achieve 80% power for detecting a small to medium effect (w = .20) with α = .05 is N = 197 for χ^2 tests.

Participants were presented with two packages of cookies, one of which included a transparent window (see Figure 1). Depending on the condition, they were instructed to choose a package of cookies either for themselves or for someone else. We counterbalanced across participants which of the two packages featured a window.

9.2.Results and Discussion

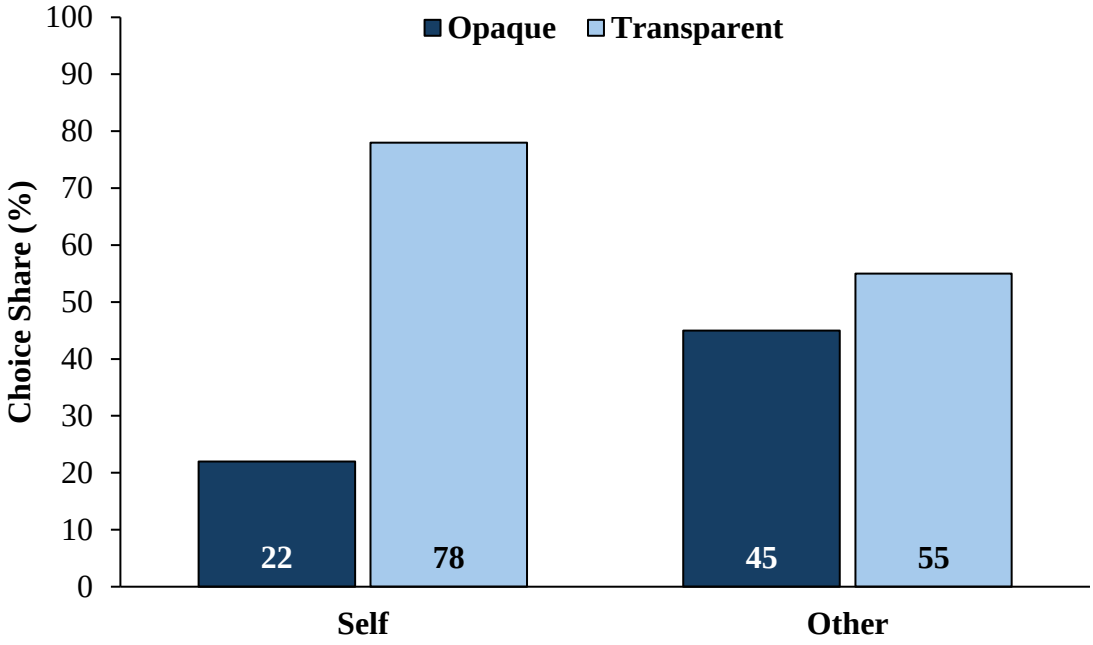
Results are illustrated in Figure 5. Replicating the previous studies, consumers significantly preferred the transparent package (78%) over the opaque one (22%) when they chose the cookies for themselves (χ^2 (1) = 31.36, p < .001). When consumers chose the cookies for someone else, however, they no longer preferred the package with the window (55%) over the opaque one (45%, χ^2 (1) = 1.20, p = .274). As predicted, preference for the transparent packaging was significantly greater when choosing for oneself than when choosing for someone else (χ^2 (1) = 11.50, p = .001).

Study 5 delivers additional support for our psychological ownership account. Participants preferred cookies in transparent packaging when they were motivated to psychologically own the product because they expected ownership, i.e. when they bought the cookies for themselves. There was no difference between the opaque and the transparent package when consumers were not motivated to psychologically own the product because they did not expect ownership, i.e. when they bought the cookies for someone else (H4). Consumers are willing to psychologically bond more strongly with a product when they buy it for themselves than for others. When buying for others, they do not need transparent packaging that enables them to psychologically appropriate the product.

We also conducted a preregistered conceptual extension of this study that approaches the question with a different design (see Web Study 2 in the Web Appendix).

FIGURE 5

CHOICE SHARES (%), STUDY 5



10. GENERAL DISCUSSION AND CONCLUSION

Packaging can be crucial in consumers' purchase decisions (Ampuero & Vila, 2006). Transparency is an often used element in packaging, and yet we know relatively little about packaging transparency and its effect on consumers. Across seven studies (plus two additional studies in the Web Appendix), participants preferred products in transparent packaging over products in opaque packaging. Notably, we find this preference for products in transparent packaging regardless of the study details. We find it in the lab and online, across divergent ways of assessing product preference, across a variety of food products (i.e., cookies, gummy bears, cinnamon, muesli, trail mix, pasta and mixed nuts) as well as a non-food product (i.e., a mug), across a variety of transparent packages including pouches and cardboard boxes with plastic windows, cardboard boxes with cut-out open windows and transparent glass jars, with either joint or separate presentation of transparently and opaquely packaged goods, and across products that differ in the amount of information a glimpse provides. Beyond demonstrating this robust preference, we provide a novel explanation for it. Previous research largely suggests that transparency affects consumers by altering their product perception via the information it provides and its visual impact on a product's aesthetics (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). Our novel account takes this theorizing one step further by showing that transparency, which reduces the barrier between a consumer and a product, can trigger a deeper psychological process of appropriation, which, in turn, increases product preference (Peck & Luangrath, 2023; Peck & Shu, 2009; Reb & Connolly, 2007). We show that transparent packaging affects preference largely because and when psychological ownership is triggered.

Moreover, we identify important boundary conditions related to consumers' motivation for psychological ownership. First, and in line with theory, we show that the positive effect of packaging transparency on preference does not generally hold for products that are undesirable to consumers (Kamleitner & Mitchell, 2018; Pierce et al., 2003). Second, transparency does not generally enhance product preference when ownership is not expected, such as when consumers choose the product for someone else (Tari & Trudel, 2024). This

product-unrelated boundary condition provides a particularly informative test of our theoretical proposition. Because the product is held constant, differences across conditions cannot be attributed to changes in the packaging's visual attractiveness or informational content.

10.1. Theoretical and Practical Contributions

The present research adds to the literature in three ways. First, it adds to the packaging literature. Existing marketing research on packaging transparency is scarce (Simmonds & Spence, 2017). It has focused on differences in perceived aesthetics between opaque and transparent packaging and on the additional information provided by packaging transparency (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). While we concur that packaging transparency may be attractive and informative, our findings suggest that there is an additional, more subtle underlying process. Packaging transparency invites experiences and interactions that facilitate psychological appropriation, which in turn leads to an increase in product preference. This novel process also implies boundary conditions that are unique to the psychological ownership account and cannot be explained by previous research. The positive effect of packaging transparency on product preference is attenuated when motivation for psychological ownership is low, either because the product is undesirable (Kamleitner & Mitchell, 2018; Pierce et al., 2003) or because consumers choose the product for someone else (Tari & Trudel, 2024).

Second, our research adds to the stream of literature on the effect of barriers. Packages essentially are a barrier to the product. This can have positive effects as it protects the product from negative outside influences such as contagion (Morales & Fitzsimons, 2007; Patrick et al., 2017), but it can also have negative effects as it separates the product from nature (Szocs et al., 2021). The key seems to lie in what the packaging separates the product from. In our research, we argue that opaque packaging can separate the product from the consumer, whereas packaging transparency reduces the barrier between them. This, in turn, facilitates the development of psychological ownership for the product, which translates into product preference.

Third, the findings add to the growing literature on psychological ownership. Previous research has investigated several ways of increasing psychological ownership for a product (e.g. Brasel & Gips, 2014; Peck et al., 2020; Peck & Shu, 2009; Stoner et al., 2018; Thürridl et al., 2020). To the best of our knowledge, this is the first work to show that psychological ownership for a product can be affected by its packaging, more specifically by packaging transparency. On a more general level, this paper is the first to show that removing a visual barrier can affect feelings of ownership. While an opaque barrier stops people from reacting to whatever is behind the barrier, transparency allows people to react to it (Marquardt et al., 2015). Our research shows that one possible consequence can be the development of psychological ownership for the otherwise hidden object.

Our findings and the novel process we demonstrate have different practical implications depending on a company's aim. For products that consumers are unlikely to wish to psychologically bond with, for instance, because the product is intended as a gift or because it is disgusting or otherwise unappealing, transparency is less important and might even backfire. However, if in doubt, our results show that package windows are mostly a window of opportunity. Transparency did not hurt preference in any of our studies. While the effect was attenuated in Studies 4 and 5, it did not flip in favor of the opaque package. In addition, our research suggests that the effect is remarkably robust across packaging materials, as we found the effect with plastic windows, open windows without any material, and glass jars. However, as we will discuss next, there is still much to learn.

TABLE 4

FUTURE RESEARCH DIRECTIONS

Research Area	Key Research Questions
Transparency Implementation	How do fully transparent packages (100% transparency) affect consumer responses compared to partial transparency? What is the optimal degree, shape and positioning of transparency for different product categories? How do different transparent materials (plastic, glass, bio-based films) influence consumer perceptions?
Product Categories	Which product categories benefit most from transparent packaging?
	Does the effect hold for other non-food products?
	Does the effect hold for other undesirable products? How does transparency affect products where contamination is a primary concern (medical supplies, personal care)?
Package Design Elements	How do product images on opaque packaging compare to transparent windows in fostering psychological ownership? What effects do images of people consuming/using products have? How do package colors, shapes, and materials interact with transparency effects?
	Does a possessive claim on the packaging attenuate the effect of packaging transparency?
Context and Environment	How does observing others interact with transparent packages influence psychological ownership? What role do online versus in-store contexts play? How do transparency effects vary across cultures with different contamination concerns? How do consumers respond to changes in packaging transparency for brands they already know? How long do psychological ownership effects from transparency persist?
Sustainability Considerations	How do sustainability claims interact with transparent packaging preferences? What are the environmental trade-offs between transparency benefits and material sustainability? How do recycling practices and regulations influence optimal transparency design?

10.2. Limitations and Future Research

Our studies are not without limitations, and given the scarcity of research on transparency, there is still substantial potential for future research (see also Table 4). One future research avenue relates to the question of how to execute transparency. In most of our studies, we used package windows. To ensure robustness of the effect, we varied shape and position of the windows (for possible effects of these parameters see Deng & Kahn, 2009; Simmonds et al., 2018a; Simmonds et al., 2019; Westerman et al., 2012) across studies. The transparent area ranged between approximately 9% and 40% (in Study 4 where only lid and label partly hid content in a transparent glass jar). However, more fully transparent packaging may produce different effects, potentially enhancing or decreasing attractiveness by allowing the product itself to more strongly influence aesthetics, and also possibly raising contamination concerns (Morales & Fitzsimons, 2007) or affecting the degree to which interaction with the packaged good feels intimate and induces psychological ownership. Our findings suggest a general mechanism (i.e., transparency affects psychological ownership) but the strength and direction of transparency effects are likely to depend on both the material and the degree of transparency.

In most of our studies, we focused on food products, which are frequently offered in transparent packaging in the marketplace. In Study 3a, we provide initial evidence that the effect also holds for a non-food product (i.e., a mug). However, we do not expect that the effect generalizes across all product categories. For instance, we showed it does not hold for vegetable stew (Study 4), which we attribute to its lack of appeal. Future research might explore whether this is also true for other unappealing products.

Prior research has also pointed to a potential downside of packaging transparency. Morales and Fitzsimons (2007) found that products in transparent packaging can be psychologically contaminated by external influences. For products where consumers are particularly concerned about their pristine condition (e.g. medical supplies, personal care items), transparent packaging may backfire. Moreover, Patrick et al. (2017) showed that transparent packaging can diminish the positive effects that product unveiling may have on perceived pristineness and product value. This act of unveiling is an important difference to our research because unveiling removes the protective barrier and thus enables participants across conditions to form a bond with the product. In contrast, in our studies the packages remained closed in both conditions. It seems plausible that the effect we observe is restricted to product acquisition, where products usually remain within their packaging. An interesting question that arises in this context is what that means for products that consumers are experienced with, i.e. already know without their packaging.

In the present research, we aimed to keep packages as comparable as possible except for the transparency. We deliberately avoided product images to isolate transparency effects (except for Study 3a), yet many real packages feature such images and previous studies did use opaque packaging with a product image as baseline (Simmonds et al., 2018b; Vilnai-Yavetz & Koren, 2013). The evidence emerging from these studies is inconsistent, likely because product images have diverging and strong effects themselves. Because our theorizing emphasizes the interactive advantages of transparency for psychological ownership, it suggests that the positive effect of packaging transparency would persist even with product images present. Additionally, packages sometimes feature people consuming products, which could influence the effects of transparency via psychological ownership in different ways. They could stimulate mental imagery (Elder & Krishna, 2022), which has been shown to foster psychological ownership (Kamleitner & Feuchtl, 2015) but also convey ownership signals from others, i.e. the people shown on the picture (Kirk et al., 2018; Lu et al., 2024), which could undermine consumers' own sense of ownership. Given the relevance of these issues, however, further research is needed to investigate the role of different pictures on packages.

Signals of ownership by others might also play a role in how strongly the effect unfolds in different settings. In supermarket settings packaging does not just "reveal its innermost self" to one single person, but to all customers. It would be interesting to investigate effects of others present and to identify how this consideration alongside other differences between online and offline settings (e.g. possibilities of separate presentation) influence the effect of transparency on preference. We varied several of these factors across our studies and in Study 2 even compared joint and separate presentation. However, there is scope for research addressing these contextual questions in more depth.

In Studies 4 and 5, we show that the effect of transparency on product preference is less pronounced when motivation to psychologically own the product is low. The effect should also be less pronounced when psychological ownership for the product is high already, even without transparent packaging. For instance, one way of enhancing psychological ownership is by using possessive pronouns (e.g., "my;" Kou & Powpaka, 2020; Peck et al., 2020). Future research could investigate whether such a possessive claim attenuates the positive effect of packaging transparency on preference.

Lastly, sustainability is an important consideration when it comes to the material composition of packages (see Sokolova et al., 2023). Including a transparent window may (be perceived to) negatively affect the sustainability of the package though the actual sustainability difference varies depending on the materials used. In our studies, we observed consistent effects across packaging materials and transparency implementations. Yet, an additional effect of transparency via sustainability concerns is possible. We know of no research on the effects of actual or perceived sustainability differences between packages with or without transparency. Given the need to move towards more sustainable packaging, future research could examine how different materials, recycling practices, and sustainability claims influence consumer preferences and environmental impact. In addition, practitioners should carefully consider issues of sustainability when designing transparent packaging.

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WEB APPENDIX

A Window of Opportunity: Transparent Packaging Affects Product Preference via Psychological Ownership

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PRETEST INFORMATIVITY

In a pretest (N = 100), we assessed how informative it is to visually examine the food products used in the studies via two items (*I learn a lot about the product by looking at it, I need to see this product to know what I will get*) on a scale from 1 (strongly disagree) to 7 (strongly agree). Each respondent evaluated all products (order randomized), and we averaged the two items per product. Results are illustrated in Table WA1.

TABLE WA1

INFORMATIVITY OF PRODUCTS

Product	M	SD
Chocolate Cookies	4.73	1.51
Gummy Bears	3.78	1.68
Ground Cinnamon	3.33	1.79
Muesli	4.67	1.62
Trail Mix	5.55	1.25
Vegetable Stew	5.33	1.22

WEB STUDY 1

Study 3a directly tested our psychological ownership account for a non-food product (i.e., a mug). In Web Study 1, we test whether the effect also holds for a food product (i.e., cookies). We again hypothesized that transparent packaging has a positive effect on product preference and that this effect is mediated by psychological ownership (H2).

Participants, Design, and Procedure

One hundred ninety-four US mTurkers (female = 45%, M_{age} = 36.3) participated in the study. According to a simulation study of statistical power in mediation analysis (Fritz and MacKinnon (2007), a sample size of 148 is required to achieve 80% power to detect small to medium effects for both a and b paths in bias-corrected bootstrap mediation models.

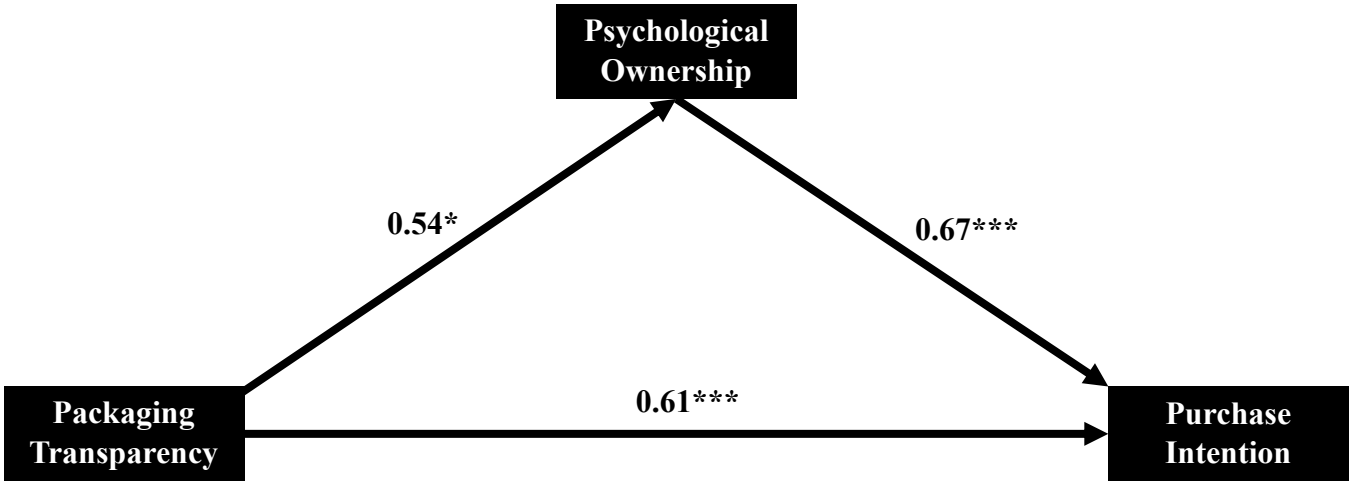
Participants were randomly assigned to evaluate either an opaque package of cookies or a package that featured a transparent window. We used the blue cookie packages from Study 1a. Respondents first rated their purchase intention on two 7-point scales (*How likely would you be to buy this pack of cookies, How likely are you to choose this pack of cookies over a pack from the brand you know best*, α = .86) and then their psychological ownership via three items (*It feels a bit as if these cookies were mine, I feel like I own these cookies, These cookies belong to me*, α = .97) adapted from Peck and Shu (2009).

Results and Discussion

As predicted, packaging transparency increased both purchase intention ($M_{transparent}$ = 3.94, SD = 1.69; M_{opaque} = 2.97, SD = 1.61; $t(192) = 4.10$, $p < .001$, $d = 0.59$) and psychological ownership ($M_{transparent}$ = 2.87, SD = 1.82; M_{opaque} = 2.32, SD = 1.45; $t(192) = 2.30$, $p = .022$, $d = 0.33$). Purchase intention and psychological ownership correlated significantly ($r = .68$, $p < .001$). As suggested by Pieters (2017), we conducted confirmatory factor analysis including the items of purchase intention and psychological ownership. The factor analysis supports discriminant validity between them: Their squared correlation is 0.46; the average variance extracted is 0.89 for psychological ownership and 0.76 for purchase intention. As shown in Figure WA1, a bootstrap mediation analysis (Hayes, 2013) with package transparency as independent variable, purchase intention as dependent variable, and psychological ownership as mediator revealed that the effect of package transparency on purchase intention was mediated by psychological ownership (indirect effect: $B = 0.36$, CI_{95} [0.06, 0.68]). The result supports H2. In addition, there was a direct effect of transparency on purchase intention ($B = 0.61$, CI_{95} [0.25, 0.96]). This significant direct effect suggests that other processes, in addition to psychological ownership, may also contribute to the effect of transparency on purchase intentions (Hayes, 2013).

FIGURE WA1

MEDIATION ANALYSIS, WEB STUDY 1



NOTE. - * $p < .05$; *** $p < .001$.

WEB STUDY 2

Web Study 2 is a preregistered (https://aspredicted.org/hn8mc.pdf) conceptual extension of Study 5. It tests whether transparent packaging increases preference more when a product is chosen for oneself than for someone else (H4).

Participants, Design, and Procedure

One hundred US Prolific panelists (female = 73%, M_{age} = 32.2) participated in the study. A priori power analysis using G*Power version 3.1.9.7 indicated that the required sample size to achieve 80% power for detecting a small to medium effect (w = .20) with α = .05 is N = 197 for χ^2 tests. The sample size of 100 was only adequate for detecting medium effects (w = .30).

Participants were presented with two packages of pasta from two different brands, one opaque and one transparent (see Figure WA2). We counterbalanced across participants which brand featured the transparent window. Participants were told to imagine that they bought these two packages of pasta, and we asked them which they would keep for themselves and which they would give to a friend.

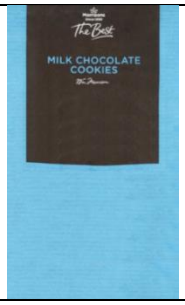
Results and Discussion

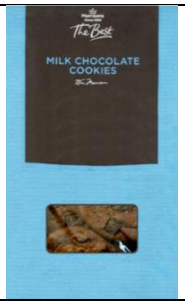
As predicted, the majority of participants (65%) chose to keep the packaging with the window for themselves and to give the opaque package to a friend. Only 35% wanted to keep the opaque packaging and give the transparent one to their friend. This preference for keeping the transparent package for oneself was significant (χ^2 (1) = 9.00, p = .003), conceptually replicating the results reported in Study 5. The fact that most consumers chose the package with the window for themselves supports our reasoning that packaging transparency increases psychological ownership for the packaged product. When the product is intended for someone else, and hence psychological ownership is undesirable, consumers prefer the package not to be transparent.

FIGURE WA2

STIMULUS MATERIALS, WEB STUDIES

Web Study 1





Web Study 2

WEB APPENDIX REFERENCES

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