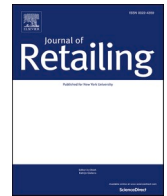




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Usage complementarity vs. basket co-occurrence: Discount depth reliance in digitally personalized product recommendations

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ABSTRACT

The present research investigates how recommending products based on usage complementarity versus basket co-occurrence affects consumers' purchase decisions. Across seven studies, we find that recommending products based on purchase co-occurrence leads consumers to overly rely on discount depth while neglecting the base price. However, recommending products based on usage complementarity attenuates this tendency. We propose that this occurs because, when products are highly complementary, consumers adopt a comprehensive (vs. topical) mental account that evaluates price information more holistically, considering both discount depths and base prices, thereby reducing the processing bias such as base price neglect. Consistent with our proposal, we find that usage complementarity mitigates another type of processing bias—arising from consumers' motivation to justify hedonic (vs. utilitarian) purchases—indicating that complementarity promotes a more comprehensive approach to price evaluation. We also find that complementarity triggers a processing style similar to the analytical processing style associated with prevention orientation (vs. promotion orientation), which involves comprehensive price evaluations.

Retailers today increasingly incorporate personalized product recommendations as part of their sales strategies. For example, online retailers such as Amazon, Walmart, or Taobao (by Alibaba) offer recommendations like “related items,” “more to consider,” or “frequently bought together” while customers browse products or proceed to checkout. These recommendations have become increasingly personalized, as retailers leverage customer data, including browsing and purchase histories, product reviews, ratings, demographics, and the behavior of similar customers. Since more than a decade ago, Amazon has generated over 35% of its retail revenue from personalized recommendations (MacKenzie et al., 2013), highlighting the pivotal role these recommendations play in driving sales. Their importance is expected to continue growing, as retailers often offer price discounts through bundles implicitly created by recommendations (Foubert and Gijbrecchts 2007; Guiltinan 1987; Heeler et al. 2007), and price discounts, including major seasonal sales (e.g., Black Friday, Cyber Monday, Amazon Prime Day), have become critical drivers of consumer spending (Kohan 2023; Rajesh et al. 2023).

Two types of multi-item recommendations stand out. The first type is based on *usage complementarity*—recommending products that are often consumed together. For example, a customer browsing a smartwatch may be recommended to purchase smart earbuds at

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a discounted price. Online retailers, such as Amazon, Walmart, and BestBuy, use features like “frequently bought together,” “items that pair well with,” or “our experts recommend,” which typically offer usage-complementary recommendations. Brand shops (e.g., P&G) frequently offer discounts across their product lines, which often are complementary in usage, when customers reach a qualifying purchase amount.

The second type of recommendation relies on *basket co-occurrence*, where products are suggested based on browsing history or purchase cycles, even if they are not usually consumed together. For example, Amazon might recommend podcasts to a customer browsing an electric shaver, noting that “customers who bought this [shaver] also listened to these Amazon Music podcasts” (see Web Appendix A for a screenshot). Similarly, Amazon’s “customers who viewed items in your purchase history also viewed” and BestBuy’s “more to consider,” “innovate your everyday,” and “recently viewed” features often make recommendations based on co-occurrence in shopping patterns rather than usage complementarity. Chinese marketplaces such as Taobao, Pinduoduo, and JD heavily rely on customers’ browsing histories to recommend additional products during the checkout stage. At the same time, they remind customers of cross-shop discounts customers can unlock by reaching a certain spending threshold (e.g., 30 RMB off every 200 RMB spent; [Tmall Taobao World 2023](#)). The cross-shop discounts are offered regardless of the complementarity between chosen products, indicating that the recommendations made during the checkout stage are mostly based on purchase co-occurrence.

Although prior research has examined how a consumer’s decision to purchase one product influences their decision to buy another that is complementary in usage (e.g., detergent and softener) or co-occurring in the basket (e.g., beer and diaper; [Manchanda et al. 1999](#)), less is known about how *recommending* products together based on these different characteristics—while offering price incentives to encourage multi-product purchases—affects consumers’ decisions to purchase the recommended items. Would recommendations based on usage complementarity versus basket co-occurrence influence how consumers evaluate sales offers and, in turn, affect their purchase decisions? The current research investigates how different recommendation types shape consumers’ purchase decisions and the underlying reasons why.

We propose that the type of recommendation influences consumers’ evaluations of sales offers (e.g., perceived discount depth) and, subsequently, their decision to purchase the recommended products. Because consumers tend to perceive complementary products as a cohesive unit, they are more likely to focus on the overall value, activating a *comprehensive* evaluation approach that considers all available price information, including base prices and discount rates of both products ([Bonini and Rumiati 1996, 2002](#); [Sheng et al., 2007](#)). In contrast, when evaluating products recommended based on basket co-occurrence, consumers are more likely to view them as separate entities. This perception activates a *topical* (i.e., narrow) evaluation approach that prioritizes discount depth, while disregarding base price information ([Kahneman and Tversky 1984](#)). In other words, with basket co-occurrence recommendations, consumers’ purchase decisions are primarily driven by discount depth—specifically, the discount depth aggregated across the two products—regardless of their base prices. However, this reliance on aggregated discount depth is expected to diminish when evaluating complementary products. In sum, the present research examines the optimal combination of products to recommend and how they should be offered, considering both recommendation type and the (aggregated) discount depth provided.

We investigate the mechanism underlying our proposed effects in two ways. First, to explore whether usage complementarity activates a comprehensive (vs. topical) evaluation approach, we test whether product complementarity mitigates another type of information-processing bias, a bias driven by consumers’ motivation to alleviate guilt associated with hedonic consumption ([Kahn and Dhar 2010](#)). Reducing this motivational bias would suggest that usage complementarity activates a comprehensive evaluation approach, which is less prone to processing biases ([Kahneman and Tversky 1984](#)). Second, we examine whether the evaluation approach activated by usage complementarity is similar to an analytical processing style, which has been shown to reduce consumers’ over-reliance on discount depth ([Chatterjee et al. 2000](#)). Specifically, we test whether consumers’ analytical processing style, associated with their prevention (vs. promotion) orientation, attenuates their over-reliance on discount depth—similar to the effect of usage complementarity—even for products recommended based on basket co-occurrence.

Our research offers both theoretical contributions and practical implications, which are closely interconnected. First, we advance the literature on base price neglect by introducing a novel moderator that has direct managerial relevance: usage complementarity (vs. purchase co-occurrence). This contrasts with previous studies that focused on theoretically important but less actionable moderators (e.g., consumer numeracy; [Guha et al. 2018](#)). In addition, unlike prior research on base price neglect (e.g., [Chen & Rao, 2007](#); [Estelami 1999](#); [Guha et al. 2018](#); [Kruger and Vargas 2008](#)), our findings suggest that discount depth—and more specifically, how it is framed—may be less crucial when recommending complementary products. Second, we contribute to the bundling literature by extending the traditional concept of bundling into the personalized recommendation context and thereby showing how recommendation types (or implicit bundle types) shape consumers’ approach to evaluating recommendations (i.e., the bundle). While previous research has largely highlighted the positive impact of complementarity on sales ([Gaeth et al. 1991](#); [Harlam et al. 1995](#); [Sheng and Pan 2009](#); [Yan and Bandyopadhyay 2011](#)), strategies to improve the effectiveness of non-complementary bundles (or recommendations) have been overlooked, despite their growing prevalence in marketplaces. Our research addresses this gap by identifying factors that can enhance the effectiveness of non-complementary product recommendations. Together, these theoretical contributions provide practical guidance on optimizing the product mix for personalized recommendations by considering the relationships between products (i.e., usage complementarity or basket co-occurrence), discount depth, and product nature (i.e., hedonic or utilitarian).

In the following sections, we review relevant literature that informs our hypotheses, present seven studies (two of which are detailed in Web Appendix D) that test our proposed effects and underlying mechanisms, and discuss the theoretical contributions and managerial implications of our findings.

1. Conceptual Development

Imagine you are interested in purchasing a smartwatch during a Cyber Monday sale. While browsing a smartwatch priced at \$100, you are recommended to purchase a coffee maker you previously viewed, priced at \$50, along with the smartwatch. In one scenario, the smartwatch is 25% off, and the coffee maker is 10% off. In another scenario, these same products are discounted at 15% and 30%, respectively. The total economic value in both cases is identical: \$120. However, would the different framing of discount depths—or more specifically, the difference in aggregated discount depth (i.e., 25% + 10% vs. 15% + 30%)—affect your intention to purchase the products together? Moreover, would your purchase intention vary depending on whether the products are complementary in usage or not? For example, if a pair of smart earbuds (\$50) compatible with the smartwatch were recommended instead of the coffee maker, would you be more, or less, inclined to purchase the two products together?

In this conceptual development section, we first review the literature on base price neglect to understand how discount depth—more specifically, its framing (e.g., 25% + 10% vs. 15% + 30%)—influence consumers' purchase decision (i.e., the relationship between the IV and DV in our conceptual model; see Fig. 1). Next, we examine the literature on bundle complementarity and its connection to mental accounting to explore how recommendations based on usage complementarity (vs. basket co-occurrence) can moderate the relationship between aggregated discount depth (IV) and consumers' purchase decisions (DV; Fig. 1).

1.1. Base Price Neglect: Overreliance on Discount Depth

Past research provides ample evidence that consumers disproportionately rely on discount depth while overlooking the base price when evaluating price attractiveness (Chen et al. 2012; Chen & Rao, 2007; DelVecchio et al. 2007; Estelami 1999; Guha et al. 2018; Kruger and Vargas 2008). For instance, consumers show a greater intention to purchase a product originally priced at \$1,199 and discounted to \$755.37 when the discount is framed as “was 59% higher.” compared to “now 37% lower” (Guha et al. 2018). Consumers rely more on discount depth than the absolute amount saved because calculating the savings requires additional effort—incorporating both the discount depth and base price (Bettman et al. 1990; Estelami 1999).

When purchasing multiple products on sale, past research suggests that consumers tend to add up the discount depths and use this total to evaluate price attractiveness, rather than calculating the absolute value saved by considering both base prices and discount depths (Chatterjee et al. 2000; Chen & Rao, 2007; Heath et al. 1995). For example, Chen & Rao, 2007 found that consumers prefer “25% off plus an additional 20% off” over a single discount of “40% off,” even though both offers are economically equivalent. This preference likely arises because the aggregated discount depth of the first offer (45%) appears greater than the discount depth of the second offer (40%).

These findings suggest that consumers are more likely to purchase recommended products together when the aggregated discount depth is large (vs. small), disregarding the base prices of the products. When this insight is applied to the example of the smartwatch and coffee maker discussed earlier, consumers are likely to perceive the offer with 15% and 30% off as more attractive than the one with 25% and 10% off, respectively. This misperception arises from the simple aggregation of discount depths (15% + 30% = 45% vs. 25% + 10% = 35%), leading consumers to overlook the base prices. In sum, a larger (vs. smaller) aggregated discount depth (IV) will

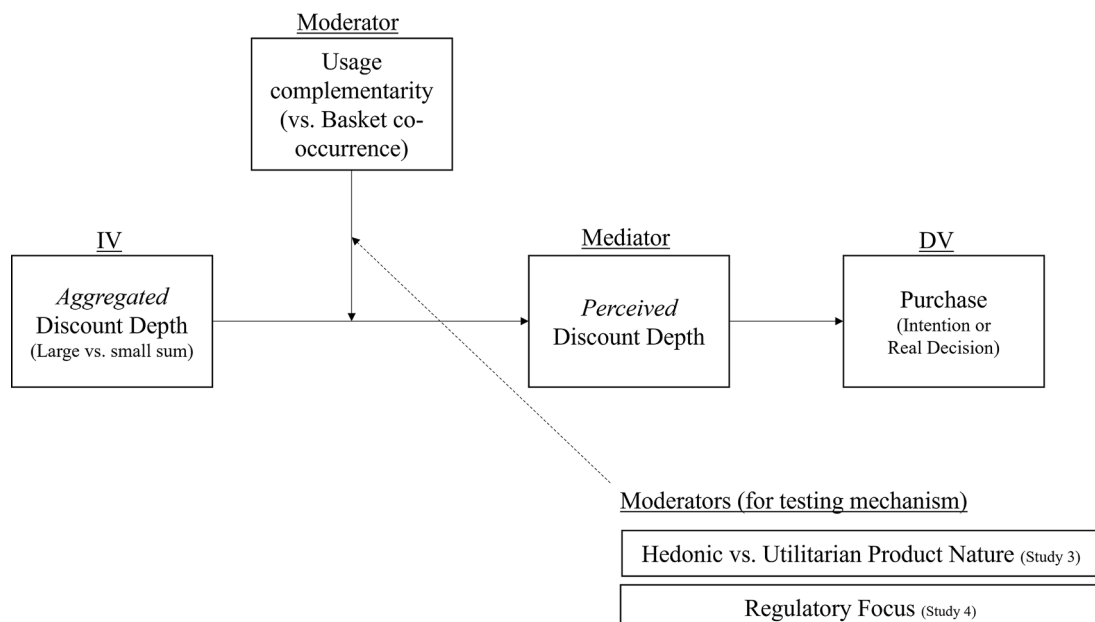


Fig. 1. Conceptual model

Table 1
Summary of Moderators for Base Price Neglect Examined in Past and Current Studies

Authors (by publication year)	Moderators Tested	Findings
Chatterjee et al. (2000)	<ul style="list-style-type: none"> Individual difference in need for cognition (NFC) or thoughtfulness (i.e., greater individual tendency to engage in effortful, analytical processing) 	<ul style="list-style-type: none"> High (vs. low) NFC alleviated base price neglect.
Chen & Rao, 2007	<ul style="list-style-type: none"> Motivation to conduct accurate calculations (i.e., offering monetary incentives) Computation difficulty Alerting the fallacy of aggregating discount depths 	<ul style="list-style-type: none"> Increasing motivation to perform accurate calculations, reducing computational difficulty, or addressing the fallacy of simply aggregating discount depths helped alleviate base price neglect.
Kruger and Vargas (2008)	<ul style="list-style-type: none"> Offering financial incentives for accuracy Individual difference in numeracy (measured by a 13-item math test) 	<ul style="list-style-type: none"> Providing financial incentives for accuracy reduced base price neglect. However, individual differences in numeracy did not mitigate base price neglect.
Chen et al. (2012)	<ul style="list-style-type: none"> Attention to the base value (individual traits or situational influences) How easy it is to calculate (e.g., ease of converting offers, small percentages) Low-priced vs. high-priced items Product familiarity 	<ul style="list-style-type: none"> Paying high attention to the base value reduced base price neglect. The preference for a bonus pack over the economically equivalent price discount diminished when the offers were easily convertible (100% more vs. 50% off) and when the promotional magnitudes were small (11% more vs. 10% off). For inexpensive products and familiar products, the base price neglect effect was attenuated.
Guha et al. (2018)	<ul style="list-style-type: none"> Individual differences in numeracy (measured using the 11-item numeracy scale from Peters et al. 2006) Small discount depth size (e.g., 10% vs. 37%) 	<ul style="list-style-type: none"> High (vs. low) numeracy alleviated base price neglect. Small (vs. large) size of discount depth alleviated base price neglect.
This research	<ul style="list-style-type: none"> Complementarity between products (i.e., products recommended based on usage complementary vs. basket co-occurrence) (H1) Moderators for the product complementarity effect (H1): <ul style="list-style-type: none"> Hedonic vs. utilitarian product nature (H3) Individual differences in regulatory focus (H4) 	<ul style="list-style-type: none"> High (vs. low) product complementary alleviates base price neglect (H1). Larger discount depth for hedonic (vs. utilitarian) products can reverse the direction of base price neglect; <i>however, base price is still neglected and thus not alleviated</i>. Importantly, even such a reversal is alleviated by high (vs. low) product complementarity (H3). Prevention- (vs. promotion-) focus alleviates base price neglect even when product complementarity is low.

increase consumers' likelihood of purchasing recommended products together (DV). This effect is expected to be driven by the misperception that a greater discount has been offered—that is, perceived discount depth serves as a mediator (Fig. 1).

Moderators of base price neglect identified in past research have been related to consumers' ability or motivation to perform complex calculations (Chatterjee et al. 2000; Chen et al. 2012; Chen & Rao, 2007; Guha et al 2018; Kruger and Vargas 2008). For example, consumer's predisposition toward thoughtful evaluation (i.e., individual differences in need for cognition) or consumer numeracy reduced their tendency to overlook base price (Chatterjee et al. 2000; Guha et al. 2018). Situational factors also mitigated this tendency. For example, consumers no longer ignored the base price when financial incentives were offered for accurate calculations (Chen & Rao, 2007; Kruger and Vargas 2008), when they were explicitly asked to pay attention to the base price (Chen et al. 2012), or when the calculation was easy (Chatterjee et al. 2000). Although these moderators were theoretically important for understanding why consumers ignore base value (i.e., due to insufficient motivation or ability to perform complex computations), they lacked direct managerial relevance (see Table 1 for a summary of past moderators). In this research, we introduce a novel moderator with clear managerial implications: usage complementarity (vs. basket co-occurrence). In the next section, we explain how this moderator shifts consumers' evaluation approach (i.e., mental accounting) and influences their reliance on aggregated discount depth (IV) when evaluating multi-product recommendations (DV; Fig. 1).

1.2. Product Complementarity and Mental Accounting

Since the online recommendations we examine implicitly encourage consumers to purchase a bundle of products, we draw on the bundling literature, which often classifies bundles based on the extent to which their components are complementary. Complementary bundles are typically conceptualized as comprising items that are used together in a consumption experience (Chiambaretto and Dumez 2012; Holbrook and Lehmann 1981). In other words, complementarity is primarily determined by usage. For example, consumers perceive greater complementarity between a toothbrush and toothpaste than between a toothbrush and toilet paper, and greater between a keyboard and a mouse than between a keyboard and a floor lamp (Chakravarti et al. 2002; Harlam et al. 1995; Holbrook and Lehmann 1981). As a result, product recommendations based on basket co-occurrence (e.g., beer and diapers) are likely to be perceived as low-complementarity bundles.

Although there may be a general perception of whether two products are complementary, the perception is not dichotomous; instead, it may vary across individuals and even for the same individual depending on the context, such as reference point. For instance, for most consumers, a smartphone and a vacuum cleaner may not be perceived as complementary; however, for consumers who use their smartphone to control their vacuum cleaner, the two products may be perceived as complementary. Yet, even for this latter group of consumers, the two products may be considered as less complementary than a smartphone and smart earbuds, which are used together more frequently. As such, prior research has measured consumers' perceptions of bundle complementarity using continuous scales rather than dichotomous ones (Sheng et al., 2007). Furthermore, perceptions of complementarity may arise from

factors beyond usage complementarity. For example, a desk and a sofa may be perceived as complementary because they belong to the same furniture category, even though they are not typically used together. Complementarity can also be influenced by visual similarity. For instance, two artworks with similar colors and shapes are likely to be perceived as more complementary—even if they are not displayed together—compared to artworks lacking such similarity (e.g., see Web Appendix B for the artworks used in Study 1-3).

A few studies have examined how product complementarity affects consumers' evaluation of price discounts (Bonini and Rumiati 1996, 2002; Sheng et al., 2007). For example, Sheng et al. (2007) found that a negative quality perception associated with a price discount was mitigated when the discounted product was bundled with a complementary product, but not when bundled with a non-complementary product. The increased complementarity or relatedness between the products seems to encourage consumers to evaluate the discount more in relation to the entire bundle (i.e., relative to the original price of the whole bundle) rather than the individual product on sale. As a result, the discount seemed less significant, mitigating its negative impact on the perceived quality of the discounted product. Similarly, Bonini and Rumiati (1996, 2002) found that when products were categorically linked (e.g., desk and chair), consumers were more likely to assess a discount in relation to the total price rather than the original price of the individual, discounted products. This effect was weaker when the products were unrelated (e.g., calculator and jacket).

These effects have been interpreted through the lens of mental accounting theory, which explains the cognitive processes consumers use to code, categorize, and assess financial activities (Thaler, 1999). Specifically, the explanation rests on the idea that consumers adopt different types of mental accounts to evaluate price discounts (Bonini and Rumiati 1996, 2002; Sheng et al., 2007). The default mental account that consumers typically use for evaluating financial activities is called a *topical account* (Kahneman and Tversky 1984; Thaler 1999). When using a topical account, consumers focus on limited information considered relevant in a specific context (Kahneman and Tversky 1984). This approach leads consumers to evaluate a discount solely in relation to the product on sale, without considering other products in the same bundle or shopping list (Bonini and Rumiati 1996, 2002; Sheng et al., 2007). In contrast, a *comprehensive account* involves evaluating an offer by considering all relevant factors or information (Kahneman and Tversky 1984; Thaler 1999). This comprehensive approach results in consumers assessing a discount in relation to the entire bundle or shopping list, rather than focusing only on the individual product (Bonini and Rumiati 1996, 2002; Sheng et al., 2007). In sum, past research suggests that complementarity or relatedness between products shifts consumers' mental account from a topical approach to a comprehensive one.

1.3. Product Complementarity Moderates Base Price Neglect by Changing Consumers' Mental Account

These past findings offer valuable insights for the context we study. First, they help us interpret the base price neglect phenomenon using the mental accounting theory. Since a topical account considers only limited, context-specific information, Kahneman and Tversky (1984) found that price evaluations using a topical account are driven by relative terms (i.e., discount depth) rather than absolute terms, which require additional information, such as the base price. As a result, consumers' general tendency to neglect base price and rely disproportionately on discount depth aligns with the notion that consumers typically adopt a topical account. In contrast, adopting a comprehensive account—one that considers all relevant factors—should encourage consumers to incorporate base price into their evaluations, helping them overcome this bias.

Second, past research on the relationship between bundle complementarity and mental accounting (Bonini and Rumiati 1996, 2002; Sheng et al., 2007) informs our expectation that product recommendations based on usage complementarity and those based on basket co-occurrence will activate different types of mental accounts. Specifically, recommendations based on basket co-occurrence (e.g., smartwatch and coffee maker), are likely to activate a topical account. Consequently, consumers are likely to neglect the base prices and rely heavily on the aggregated discount depth. Thus, they are more likely to purchase the products when the aggregated discount depth is large (vs. small), even if the economic value remains identical. In contrast, product recommendations based on usage complementarity (e.g., smartwatch and smart earbuds) are likely to activate a comprehensive mental account, which considers both base price information and discount depth. As a result, consumers' decisions to purchase complementary products are less likely to be affected by the aggregated discount depth. In sum, we propose that the complementarity between recommended products (usage complementarity vs. basket co-occurrence) will change the type of mental account consumers adopt, which, in turn, will moderate the effect of aggregated discount depth on their purchase decisions. As discussed earlier, complementarity between products is subjective and can vary across individuals and contexts. Therefore, to enhance the applicability of our proposal, we frame our hypotheses around a continuous construct, *perceived complementarity*, rather than a dichotomous one (usage complementarity vs. basket co-occurrence). This approach would also help prevent potential confounding between recommendation types that could occur in real-world marketplaces. For instance, recommendations based on basket co-occurrence might inadvertently align with usage complementarity (e.g., shampoo and conditioner could be recommended together due to purchase cycles or browsing history, rather than solely because of their usage complementarity).

H1: When perceived complementarity between recommended products is low, a large (vs. small) aggregated discount depth will increase consumers' likelihood of purchasing the products. In contrast, when perceived complementarity is high, the effect of aggregated discount depth on consumers' purchase decision will be attenuated.

We further propose that consumers are more likely to purchase products recommended based on basket co-occurrence when the aggregated discount depth is large (vs. small) because they *misperceive* the larger discount as indicating a better deal (i.e., greater value saved), without considering the base prices. In other words, when product complementarity is low, we expect that perceived discount depth (i.e., consumers' perception of how much value has been saved) will mediate the effect of aggregated discount depth on consumers' purchase decision (see Fig. 1). However, when products are complementary in usage, consumers are more likely to

consider the base price due to the activation of a comprehensive mental account. This prevents them from misperceiving the aggregated discount depth as an accurate reflection of the amount saved. Therefore, consumers' decisions to purchase complementary products will be less influenced by the aggregated discount depth.

H2: When perceived complementarity between recommended products is low, perceived discount depth will mediate the effect of aggregated discount depth on consumers' decision to purchase the products. In contrast, when perceived complementarity is high, perceived discount depth is not likely to mediate the relationship between aggregated discount depth and purchase decisions.

1.4. Product Complementarity Attenuates Motivational Bias in Processing Price Information

If product complementarity activates a comprehensive mental account, as we have proposed, it should attenuate other types of processing biases beyond the bias resulting from base price neglect that we discussed so far. To explore our proposed mechanism, we examine whether product complementarity reduces another type of bias—a motivational bias identified in past research. Previous studies have found that consumers often feel guilty about purchasing hedonic products, as hedonic products are perceived as discretionary or wasteful, compared to utilitarian products (Okada 2005; Strahilevitz and Myers 1998). To alleviate this guilt, consumers are motivated to justify their hedonic purchases (Choi & Park, 2024; Dhar & Wertenbroch, 2000; Okada 2005; Strahilevitz and Myers 1998; Mishra and Mishra 2011). When a price discount is offered, the monetary saving helps justify hedonic purchases and alleviate the guilt, and as a result, effectively increases sales of hedonic products (Choi et al. 2014, Choi, Madhavaram, & Park, 2020; Kivetz and Zheng 2017). This motivation to alleviate guilt is also evident in consumers' evaluation of mixed bundles comprising both hedonic and utilitarian products. Specifically, consumers prefer a mixed bundle more when a price discount is applied to the hedonic item than when the same discount is applied to the utilitarian item because the monetary saving on the hedonic item more effectively alleviates guilt (Khan and Dhar 2010). This finding indicates that consumers' motivation to alleviate guilt leads to a processing bias that overweighs the discount depth of hedonic products. We test whether increased product complementarity can overcome this motivation-driven bias by activating a comprehensive (vs. topical) mental account.

Suppose that there are two sets of recommendations offering the same economic value:

- Recommendation A: utilitarian product (\$10, 20% off) + hedonic product (\$20, 15% off)
- Recommendation B: utilitarian product (\$10, 30% off) + hedonic product (\$20, 10% off).

When the products are not complementary, consumers are expected to prefer Recommendation B because it offers a greater aggregated discount depth (40%) than Recommendation A (35%). However, if consumers place a greater weight on the hedonic product to justify their hedonic purchase and alleviate guilt, this prediction is less likely to hold. Instead, consumers may prefer Recommendation A, which offers a greater discount for the hedonic product even though the aggregated discount depth is smaller. In other words, the previously proposed effect of aggregated discount depth (H1) can be attenuated or even reversed. Importantly, this reversal is more likely when perceived complementarity between the products is low (vs. high), leading consumers to adopt a topical (vs. comprehensive) mental account that enhances consumers' discrete focus on the hedonic (vs. utilitarian) product and its discount depth. On the other hand, when a comprehensive mental account is activated—due to high perceived complementarity—this motivational bias will be attenuated. A comprehensive account will encourage consumers to consider all relevant factors, including the base price of the hedonic product and the price information of the utilitarian product. In sum, increasing perceived complementarity between products will attenuate the motivational bias favoring a larger discount offered on the hedonic (vs. utilitarian) product. Therefore, we hypothesize:

H3: When a hedonic product and a utilitarian product are recommended together and their perceived complementarity is low, a greater discount depth on the hedonic (vs. utilitarian) product can attenuate or even reverse the impact of aggregate discount depth on consumers' decisions to purchase the products. In contrast, when perceived complementarity is high, neither the discount depth of the hedonic (vs. utilitarian) product nor the aggregate discount depth is likely to affect consumers' purchase decisions.

Note that a topical account adopted under low (vs. high) perceived complementarity not only encourages the cognitive bias that focuses on aggregated discount depth (H1) but also strengthens the motivational bias that focuses on discount depth of hedonic products (H3), which can override or even reverse the cognitive bias. In contrast, a comprehensive mental account mitigates both the cognitive and motivational biases, as it encourages a more holistic evaluation of price information rather than a narrow, topical one.

1.5. Consumers' Regulatory Focus as a Moderator for the Proposed Effects

As the mechanism underlying our proposed effects, we have proposed that product complementarity activates a comprehensive account that engages in a more comprehensive and effortful calculation, using both base prices and discount depths. In other words, the analytical processing style associated with a comprehensive mental account plays a critical role in overcoming the base price neglect tendency. This implies that consumers inclined toward analytical processing should overcome this tendency, even when the perceived complementarity between recommended products is low. Our proposal is consistent with past research showing that individuals with a higher ability to perform complex calculations, such as those with stronger tendencies for thoughtful evaluation (also

called need for cognition or effortful, analytical processing; Chatterjee et al. 2000) or higher consumer numeracy, are less prone to neglect base prices (Guha et al. 2018; see Table 1).

Building on these findings, we examine our proposed mechanism, that product complementarity activates a comprehensive mental account, by testing whether an analytical processing style can substitute for the role of product complementarity. Specifically, we examine whether consumers who tend to engage in analytical processing can overcome the base price neglect tendency and remain unaffected by aggregated discount depth, even when the recommended products lack complementarity. To explore this, we introduce a moderator related to individuals' tendency to engage in analytical processing—regulatory focus—which has not been studied in the context of base price neglect (see Table 1). We compare the processing style associated with regulatory focus to the style activated by product complementarity.

Regulatory focus influences consumers' information-processing style (Basu and Ng 2021; Lee et al. 2014; Roy and Phau 2014). Prevention-focused individuals tend to engage in analytical processing, while promotion-focused individuals rely more on visual processing (Roy and Phau 2014). Prevention-focused individuals adopt a local processing style, attending to specific details, whereas promotion-focused individuals adopt a global style, focusing on the primary or most relevant features of information (Lee et al. 2014; Trope and Liberman 2000; 2010). Moreover, prevention-focused individuals prioritize accuracy in decision-making, while promotion-focused individuals emphasize speed (Higgins 1999). As a result, prevention-focused individuals are less susceptible to framing effects compared to promotion-focused individuals. For instance, Basu and Ng (2021) found that prevention- (vs. promotion-) focused individuals are less influenced by temporal framing effects (e.g., "\$100 a month" vs. "\$1200 a year") because they consider non-salient contextual background along with primary information.

Based on these past findings, we expect that aggregated discount depth (i.e., how discount depth is framed) is not likely to affect the purchase intention of prevention-focused consumers, regardless of whether recommended products are highly complementary or not. In other words, among prevention-focused consumers, we do not expect to observe the interaction between perceived complementarity and aggregated discount depth that we hypothesized earlier (i.e., H1; see Fig. 1). In contrast, for promotion-focused consumers, we expect to observe the proposed effect (H1). Specifically, for promotion-focused consumers, aggregated discount depth is likely to influence their purchase decisions when perceived product complementarity is low, but not likely when it is high.

H4: For prevention-focused consumers, aggregated discount depth is not likely to affect their decision to purchase recommended products, regardless of whether the perceived complementarity between the products is high or low. In contrast, for promotion-focused consumers, a large (vs. small) aggregated discount depth will increase the likelihood of purchasing the products when perceived complementarity is low, but this effect will be attenuated when perceived complementarity is high.

2. Overview of Studies

Across seven studies, we tested whether increasing complementarity between recommended products attenuates consumers' tendency to ignore base prices and overly rely on discount depth (i.e., aggregated discount depth across two products) in their product evaluations. In studies 1-1 to 1-3, we used different product categories to replicate our basic effects (H1, H2). Specifically, we find that when complementarity between recommended products is low, a larger aggregated discount depth increases consumers' intention to purchase the products. In contrast, when complementarity is high, the effect of aggregated discount depth is attenuated (H1). Additionally, this effect of aggregated discount depth on consumers' intention to purchase non-complementary products is mediated by the misperception that greater savings are achieved with a larger aggregated discount depth (H2). In study 2, we replicated these effects (H1 and H2) on participants' actual purchase decision, not just their intention.

In studies 3 and 4, we examine our proposed mechanism that high (vs. low) perceived complementarity activates a comprehensive (vs. topical) mental account, which, in turn, attenuates consumers' overreliance on discount depth. In study 3, we show that high product complementarity mitigates another type of information processing bias, driven by the motivation to justify hedonic purchases and alleviate the associated guilt (H3). The results indicate that product complementarity activates a comprehensive mental account that is resistant to both the motivational bias (H3) and the cognitive bias (H1). In study 4, we find that, similar to when highly complementary products are recommended, prevention-focused participants are not affected by aggregated discount depth even when evaluating non-complementary products. This finding indicates that the information-processing style triggered by product complementarity is similar to the analytical processing style associated with prevention orientation, which considers both discount depths and base prices (H4).

3. Study 1-1: Product Complementarity Moderates Base Price Neglect

In study 1-1 (pre-registered: <https://aspredicted.org/hrjx-fgm8.pdf>), we tested our primary hypothesis that increasing complementarity between products attenuates consumers' tendency to overly rely on aggregated discount depth and neglect base prices in their purchase decisions (H1). We also examined whether this tendency, observed when product complementarity is low, is driven by consumers' misperception that a larger aggregated discount depth provides greater savings (i.e., a better deal) (H2).

3.1. Design and Procedure

Four hundred and two U.S. participants were recruited from Connect (CloudResearch) ($M_{\text{age}} = 39.8$ years; 200 males, 193 females, and 9 others) and were randomly assigned to one of four conditions in a 2 (aggregated discount depth: large sum vs. small sum) \times 2

(complementarity: high vs. low) between-subjects design. All participants were asked to imagine that they were recommended of two products to be purchased together while shopping online (see Web Appendix B). In the high-complementarity condition, participants were recommended a smartwatch and smart earphones. The product description stated that the two products are compatible. In the low-complementarity condition, the recommended products were a smartwatch and a coffee maker. Participants were told that the recommendation was based on their past browsing history. At the bottom of the product descriptions, price information was presented according to their aggregated discount depth condition. In the small-sum condition, the prices were displayed as “18% off \$1000 + 15% off \$300”. In the large-sum condition, the prices were shown as “15% off \$1000 + 25% off \$300”. The final price in both conditions were identical (\$1075), but the aggregated discount depth was smaller in the small-sum condition (33%) than in the large-sum condition (40%).

After reading their assigned product description, participants responded to the two key dependent measures. First, they reported perceived discount depth that measured the extent to which they thought the discount offered in the deal was small or large on a 7-point scale (1 = very small discount, 7 = very large discount). Second, they reported their purchase intention for the products using two 7-point items (1 = not at all likely, 7 = very likely; 1 = not at all willing, 7 = very willing; $\alpha = .96$). Next, participants completed two complementarity manipulation checks to assess the extent to which they perceived the products as complementary (i.e., “To what extent are the two bundled items complementary to each other?”; “How complementary to each other are the two bundled items?”; modified the measures of Sheng et al., 2007) on a 7-point scale (1 = very non-complementary, 7 = very complementary ($\alpha = .98$)). Finally, participants reported their age and gender.

3.2. Results and Discussion

3.2.1. Complementarity Manipulation Check

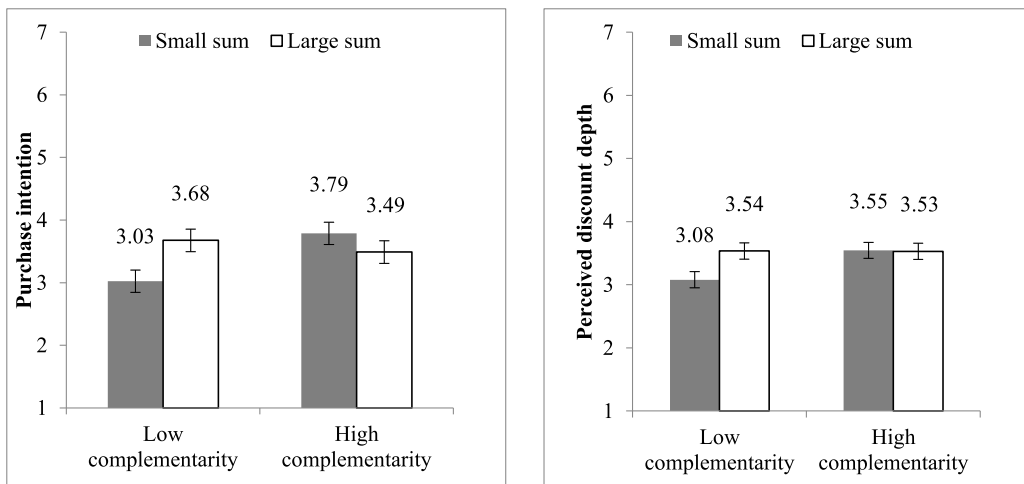
As intended, participants perceived the products to be more complementary in the high-complementarity condition than in the low-complementarity condition ($M_{\text{high}} = 4.45$, $SD = 1.59$; $M_{\text{low}} = 2.06$, $SD = 1.42$; $F(1, 400) = 251.80$, $p < .001$).

3.2.2. Purchase Intention

A 2×2 ANOVA was conducted to test whether product complementarity attenuates the effect of aggregated discount depth on purchase intention (H1). We observed a significant two-way interaction between aggregated discount depth and complementarity ($F(1, 398) = 7.01$, $p = .008$). Consistent with H1, when complementarity between the two products was low, participants indicated greater purchase intention for the products whose aggregated discount depth was large (vs. small) (3.68 vs. 3.03, $F(1, 398) = 6.62$, $p = .01$). In contrast, the effect of aggregated discount depth on purchase intention was not reliable when complementarity was high ($F(1, 398) = 1.37$, $p > .24$).

3.2.3. Perceived Discount Depth

The same ANOVA revealed a marginal two-way interaction between aggregated discount depth and complementarity on perceived discount depth ($F(1, 398) = 3.37$, $p = .067$). Follow-up planned contrasts showed that when complementarity between the two products was low, participants misperceived that a large (vs. small) aggregated discount depth provided greater savings (3.54 vs. 3.08, $F(1, 398) = 6.33$, $p = .012$). However, when complementarity was high, this difference in perceived discount depth between the two aggregated discount depth conditions disappeared ($F(1, 398) < 1$) (see Figs. 2 and 3).



Figs 2 and 3. The effect of aggregated discount depth on purchase intention (Fig. 2) and perceived discount depth (Fig. 3), moderated by product complementarity (study 1-1)

3.2.4. Moderated Mediation

We conducted a moderated mediation analysis to test whether the effect of aggregated discount depth on purchase intention was mediated by perceived discount depth when complementarity between the products was low, but not when it was high (H2). The analysis included aggregated discount depth as the independent variable, purchase intention as the dependent variable, perceived discount depth as the mediator, and complementarity (1 = high complementarity, 0 = low complementarity) as the moderator (Hayes, 2013, PROCESS model 7, 10,000 bootstrap samples). The indirect effect of aggregated discount depth on purchase intention through perceived discount depth was significant when complementarity was low ($b = .36$, Boot SE = .15, 95% Boot CIs: [.0792 to .6577]), but not when complementarity was high ($b = -.01$, Boot SE = .14, 95% Boot CIs: [-.2949 to .2642]). Although the moderated mediation index was not significant ($b = -.37$, Boot SE = .21, 95% Boot CIs: [-.7936 to .0249]), the results altogether suggest that the mediation pathway might still operate differently depending on the condition, as hypothesized.

As a follow-up study, we conducted a direct replication of study 1-1 using nearly identical manipulations of complementarity and aggregated discount depth (see Web Appendix B for the stimuli used in the study). In this supplementary study, we observed a significant index of moderated mediation, along with the significant two-way interaction and planned contrasts (see Web Appendix D for the full procedure and results of the supplementary study). The index of moderated mediation was also significant in subsequent studies that conceptually replicated the H1 and H2 effects, either using different product categories (studies 1-2, 1-3, and 2) or the same product categories with additional conditions (study 4).

3.2.5. Discussion

Study 1-1 shows that complementarity between recommended products reduces the effect of aggregated discount depth (i.e., overreliance on discount rates while neglecting base prices) on consumers' intention to purchase the products. These results are consistent with our proposal that high product complementarity activates a comprehensive (vs. topical) mental account, encouraging consumers to consider both discount rates and base price information in their product evaluations.

In study 1-1, only participants in the low complementarity condition (and not those in the high complementarity condition) were informed that the products were recommended based on their browsing history. This information may have led to a misinterpretation that the browsed products were somehow related (e.g., based on their interests), potentially conflating the low complementarity condition (i.e., basket co-occurring recommendation) with the high complementarity condition (i.e., usage complementary recommendation). It may also have influenced participants' levels of interest or involvement in the products differently across the complementarity conditions. To eliminate these possible confounds in subsequent studies, we either informed *all* participants that the recommended products were based on their browsing history (study 1-2) or did not mention browsing history at all (from study 1-3 through study 4, as well as the supplementary study replicating study 1-1 reported in Appendix D). Since our hypothesized effects were consistently observed across all studies, regardless of whether participants were informed about browsing history, we are confident that the operationalization of complementarity in study 1-1 did not influence the results.

4. Study 1-2: Replicating the Effects Using Different Product Categories

In study 1-2 (pre-registered: <https://aspredicted.org/hrjx-fgm8.pdf>), we conceptually replicated the effects observed in the earlier study using a different product category.

4.1. Design and Procedure

A total of 404 U.S. participants were recruited from Connect ($M_{age} = 37.1$ years; 182 males, 210 females, and 12 others) and randomly assigned to one of four conditions in a 2 (aggregated discount depth: large sum vs. small sum) \times 2 (complementarity: high vs. low) between-subjects design. All participants were asked to imagine that they were shopping online and were recommended of two products. Unlike Study 1-1, all participants were told that they had browsed these products previously and that the recommendations were based on their browsing history. In the high-complementarity condition, a golf club and a golf putting practice mat, which were complementary in usage, were recommended. In the low-complementarity condition, a golf club and a standing punching bag were recommended (see Web Appendix B). Participants were also shown the price information according to their aggregated discount depth condition, which was identical to that of study 1-1. Specifically, in the small-sum condition, the prices were presented as "18% off \$1000 + 15% off \$300," whereas in the large-sum condition, the prices were "15% off \$1000 + 25% off \$300."

After reviewing the product and price descriptions, participants responded to measures of perceived discount depth (1-item, 7-point scale), purchase intention (2-item, 7-point scale; $\alpha = .96$), and complementarity manipulation check (2-item, 7-point scale; $\alpha = .99$), all identical to those used in study 1-1. Finally, participants provided demographic information, including their age and gender.

4.2. Results and Discussion

4.2.1. Complementarity Manipulation Check

As intended, participants perceived greater complementarity between the recommended products in the high- (vs. low-) complementarity condition ($M_{high} = 6.10$, $SD = 1.24$; $M_{low} = 2.55$, $SD = 1.57$; $F(1, 402) = 637.0$, $p < .001$).

4.2.2. Purchase Intention

A 2 \times 2 ANOVA was conducted to examine whether product complementarity moderated the effect of aggregated discount depth

on purchase intention (H1). We found a marginally significant interaction between aggregated discount depth and complementarity ($F(1, 400) = 2.88, p = .090$). Consistent with H1, when product complementarity was low, participants' purchase intention was higher when aggregated discount depth was large (vs. small) (4.11 vs. 3.45, $F(1, 400) = 7.47, p = .007$). However, this effect of aggregated discount depth on purchase intention was not observed when complementarity was high ($F(1, 400) < 1$).

4.2.3. Perceived Discount Depth

The same ANOVA revealed a significant interaction between aggregated discount depth and complementarity on perceived discount depth ($F(1, 400) = 6.47, p = .011$). Follow-up planned contrasts showed that when product complementarity was low, participants misperceived receiving greater savings in the large (vs. small) aggregated discount depth condition (3.98 vs. 3.26, $F(1, 400) = 16.03, p < .001$). However, when complementarity was high, this difference was not observed ($F(1, 400) < 1$) (see Figs. 4 and 5).

4.2.4. Moderated Mediation

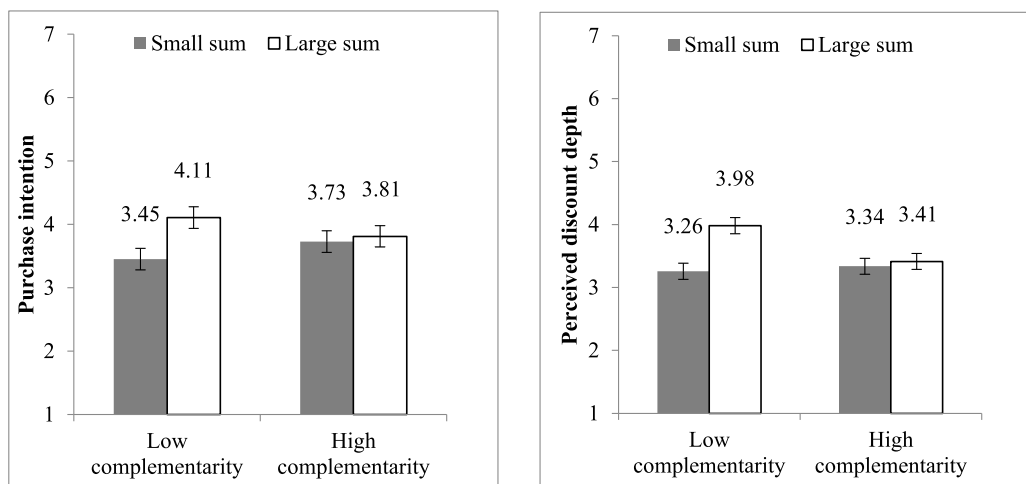
We conducted a moderated mediation analysis to examine whether the effect of aggregated discount depth on purchase intention was mediated by perceived discount depth when product complementarity was low, but not when it was high (H2). The analysis included aggregated discount depth as the independent variable, purchase intention as the dependent variable, perceived discount depth as the mediator, and complementarity (1 = high complementarity, 0 = low complementarity) as the moderator (Hayes, 2013, PROCESS model 7, 10,000 bootstrap samples). Consistent with H2, the indirect effect of aggregated discount depth on purchase intention through perceived discount depth was significant when complementarity was low ($b = .55$, Boot SE = .15, 95% Boot CIs: [.2800 to .8484]), but not when complementarity was high ($b = .0572$, Boot SE = .14, 95% Boot CIs: [-.2163 to .3337]). The index of moderated mediation was significant ($b = -.49$, Boot SE = .20, 95% Boot CIs: [-.9089 to -.1174]), indicating that the two indirect effects at different levels of complementarity were significantly different.

4.2.5. Discussion

Using different product categories, we replicated our proposed effects, demonstrating that product complementarity attenuates consumers' tendency to overly rely on aggregated discount depth without considering the base price information (H1). We also confirmed that the overreliance, observed only for products with low complementarity, is driven by the misperception that a greater aggregated discount depth indicates greater savings.

In study 1-3 (see Web Appendix D for full study procedure and results), we replicated H1 and H2 again using different manipulations of complementarity and aggregated discount depth. First, unlike earlier studies, study 1-3 provided the price after discount alongside the base price and discount rate information (e.g., 10% off \$10 \$9 + 25% off \$20 \$15). This presentation was intended to help participants consider both base prices and discount rates. However, we found that even with the inclusion of post-discount prices, participants failed to account for base prices when product complementarity was low. In contrast, high product complementarity attenuated their overreliance on discount rates. Second, study 1-3 used two sets of artworks to manipulate product complementarity, with complementarity primarily perceived from visual similarity rather than usage complementarity—the two concepts that are distinct, though related (see Web Appendix B). Replicating our proposed effects (i.e., H1 & H2) using this complementarity manipulation broadens the implications of our findings to contexts in which complementarity is perceived from sources other than usage complementarity (e.g., visual similarity).

In the next study, we measured participants' perceived complementarity of the recommended products rather than manipulating it. This approach further extends the implications of our findings, showing that consumers' evaluations of a given discount offer can vary



Figs 4 and 5. The effect of aggregated discount depth on purchase intention (Fig. 4) and perceived discount depth (Fig. 5), moderated by product complementarity (study 1-2)

based on their subjective perceptions of how complementary the recommended products are.

5. Study 2: Real Decision Study

Study 2 was designed to replicate our primary effect (H1) on participants' actual purchase decisions, while measuring (rather than manipulating) product complementarity.

5.1. Design and Procedure

Six hundred and nine U.S. participants ($M_{\text{age}} = 36.1$ years; 299 males, 299 females, and 11 other) were recruited from Amazon Mechanical Turk and were randomly assigned to one of two aggregated discount depth conditions: small sum versus large sum. At the beginning of the study, all participants were informed that they would have a chance to win a \$25 bonus prize in addition to receiving their promised compensation.

All participants were presented with a kitchen clock and glass mugs (see Web Appendix B). Participants in the small-sum condition viewed the following price description: "Digital Clock: 10% off - Was \$10 and Now \$9 + Glass coffee mugs: 25% off - Was \$20 Now \$15." Those in the large-sum condition viewed: "Digital Clock: 30% off - Was \$10 and Now \$7 + Glass coffee mugs: 15% off - Was \$20 Now \$17". While the total price of the products was identical across the two conditions (\$24), the aggregated discount depth differed (35% vs. 45%).

After reading the product description, participants responded to dependent measures. They first reported perceived discount depth and purchase intention ($\alpha = .79$) using the scales identical to those used in earlier studies. Afterwards, participants responded to the two-item perceived product complementarity measure, which was identical to the complementarity manipulation checks used in earlier studies ($\alpha = .76$). Finally, participants responded to a measure with real financial consequences. Specifically, they were informed that all participants would have a chance to win a \$25 bonus prize, which could be used to purchase the limited-time bundle offer they had observed earlier. Participants pre-committed their decision to purchase the bundle with the bonus or not (0 = No, 1 = Yes), and this decision could not be changed if they became the winner. Lastly, participants provided their demographic information.

In the debriefing statement, participants were informed that if the specific products featured in the study were unavailable, the winner would instead receive a \$25 bonus payment. At the conclusion of the study, we randomly selected one winner and awarded the \$25 bonus.

5.2. Results

5.2.1. Actual Purchase Decisions

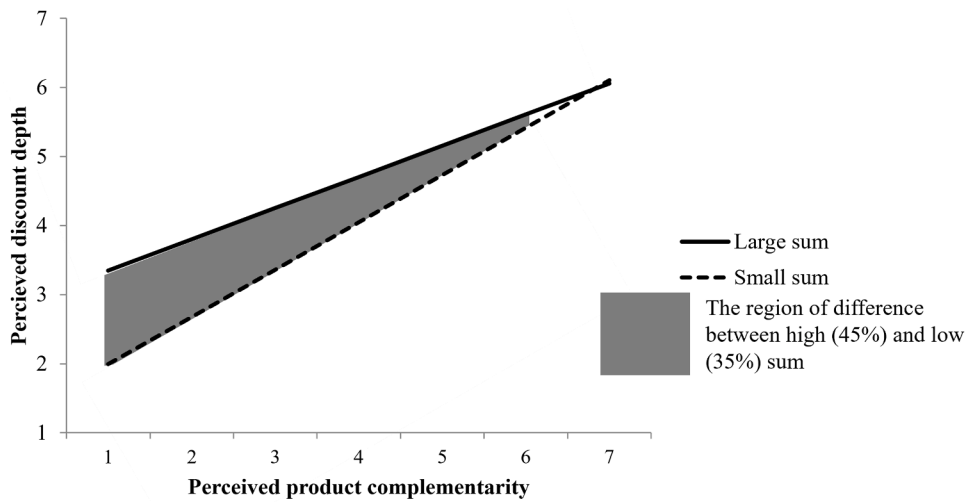
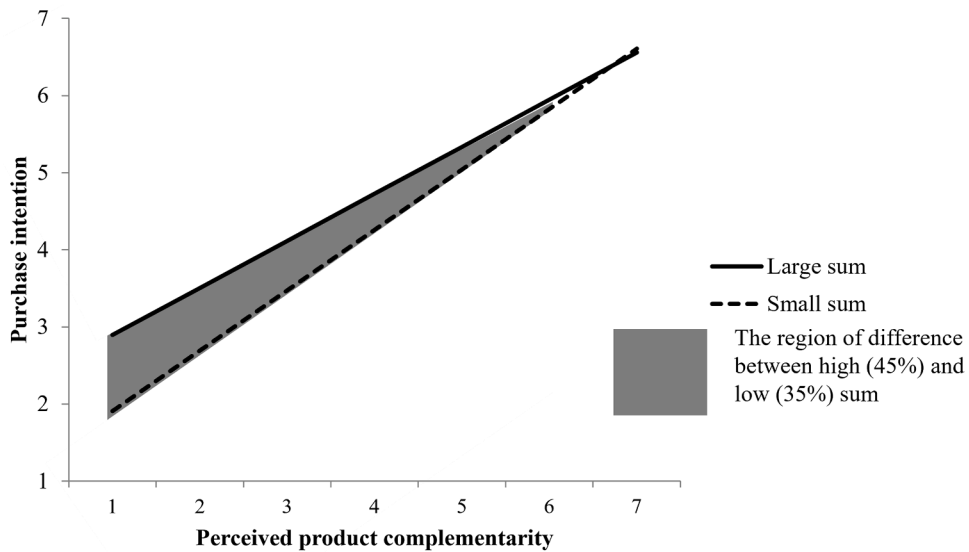
We conducted a binary logistic regression with participant's purchase decisions (1 = Yes, 0 = No) as the dependent variable. Aggregated discount depth (1 = large, 0 = small), perceived complementarity, and their interaction term were included as predictors. The binary logistic regression revealed a significant interaction effect ($B = -2.47$, $SE = .87$, $Z = -2.85$, $p = .0044$, 95% CI: [-4.1630, -.7710]). The Johnson-Neyman technique showed that participants who reported a perceived complementarity score of 5.76 or lower were more likely to purchase the products using the bonus money when the aggregated discount depth was large (vs. small) ($b_{\text{JN}} = 1.74$, $SE = .89$, $z = 1.96$, $p = .05$). However, aggregated discount depth did not affect purchase decision among participants with a perceived complementarity score higher than 5.76.

5.2.2. Purchase Intention

We tested whether purchase intention showed a similar pattern to participants' actual purchase decisions. We regressed purchase intention on aggregated discount depth, perceived complementarity, and their interaction term. A significant interaction was observed ($B = -.17$, $SE = .06$, $t(605) = -2.71$, $p = .007$, 95% CI: [-.2982, -.0475]). The Johnson-Neyman technique revealed that participants who reported the perceived complementarity score of 6.05 or lower showed greater intention to purchase the products when their aggregated discount depth was large (vs. small) ($b_{\text{JN}} = .11$, $SE = .058$, $t(605) = 1.96$, $p = .05$). However, purchase intention was not affected by aggregated discount depth among participants who reported the perceived complementarity score greater than 6.05.

5.2.3. Perceived Discount Depth

We regressed perceived discount depth on aggregated discount depth, perceived complementarity, and their interaction term. The interaction was significant ($B = -.23$, $SE = .11$, $t(605) = -2.22$, $p = .027$, 95% CI: [-.4399, -.0267]). The Johnson-Neyman technique revealed that participants with a perceived complementarity score of 6.02 or lower perceived the discount (i.e., savings) to be greater when aggregated discount depth was large (vs. small) ($b_{\text{JN}} = .19$, $SE = .09$, $t(605) = 1.96$, $p = .05$). However, aggregated discount depth did not influence perceived discount depth among participants with a perceived complementarity score greater than 6.02 (see Figs. 6 and 7).



Figs 6 and 7. The effect of aggregated discount depth on purchase intention (Fig. 6) and perceived discount depth (Fig. 7), moderated by perceived product complementarity (study 2)

5.2.4. Moderated Serial Mediation

Finally, we conducted a moderated mediation analysis to test whether the effect of aggregated discount depth on purchase decision was serially mediated by perceived discount depth and purchase intention among participants who perceived the products to be less complementary, but not among those who perceived the products to be highly complementary (Hayes, 2013, model 83, 10,000 bootstrapped samples). The indirect effect of aggregated discount depth on purchase decision through perceived discount depth and purchase intention was significant among participants who perceived the products to be less complementary (when complementarity score = 5.0: $b = .14$, Boot SE = .06, 95% CIs: [.0596 to .2735]). In contrast, the indirect effect was not significant among participants who perceived the products to be highly complementary (when complementarity score = 6.0: $b = .06$, Boot SE = .04, 95% CIs: [-.0028 to .1677]; when complementarity score = 7.0: $b = -.01$, Boot SE = .07, 95% CIs: [-.1528 to .1283]). The index of moderated mediation was significant ($b = -.0776$, Boot SE = .05, 95% CIs: [-.1851 to -.0060]), indicating that the indirect effects at different levels of perceived complementarity differed reliably.

This study shows that the effects observed in the earlier studies (H1 and H2) are not limited to consumers' purchase intentions but extend to their actual decisions. Furthermore, by measuring product complementarity on a continuous scale, we showed that, as perceived product complementarity increases, consumers' overreliance on discount rates (i.e., base price neglect) decreases. We demonstrated that the effect of product complementarity is a not binary but continuous, varying across individuals even for the same set of recommended products.

6. Study 3

The results from previous studies were consistent with our proposal that increasing product complementarity shifts consumers' mental account from a topical one to a comprehensive one, encouraging more comprehensive and effortful price evaluations. As a result, this shift attenuated consumers' tendency to overly rely on discount depth. In the next study, we tested our proposed mechanism by examining whether high complementarity can attenuate other types of information processing bias observed in past research. Previous studies have shown that consumers are motivated to justify their hedonic purchases to alleviate guilt associated with buying hedonic products, which are often viewed not as necessary as utilitarian products (Okada 2005; Strahilevitz and Myers 1998). Consequently, when a hedonic product and a utilitarian product are bundled together, consumers tend to place a greater weight on the discount depth offered to the hedonic (vs. utilitarian) product, which helps them mitigate the guilt (Khan and Dhar 2010). This motivational bias may even override the cognitive bias of overly relying on aggregated discount depth. In other words, consumers may prefer a set of recommended products with a smaller aggregated discount depth if the discount on the hedonic product is larger, even though the overall discount depth is smaller (i.e., a reversal of H1). Importantly, we tested whether this strong motivational bias, which still neglects base price, can also be attenuated by the comprehensive mental account activated by high product complementarity (H3).

6.1. Design and Procedure

Two hundred and twenty-two undergraduate students from a major Midwestern university participated in this study in exchange for partial course credit ($M_{\text{age}} = 20.15$ years; 118 males, 103 females, and 1 other). Participants were randomly assigned to one of two aggregated discount depth conditions: large sum with a small hedonic discount or small sum with a large hedonic discount. All participants viewed a description of a mixed bundle consisting of a utilitarian product (i.e., E-Book/Textbook Credit) and a hedonic product (i.e., Entertainment Digital Credit). In the large sum with a small hedonic discount condition, the aggregated discount depth was larger ($25\% + 10\% = 35\%$), but the discount on the hedonic product was smaller (10%): "E-Book/Textbook Credit: 25% off - Was \$40 Now \$30 + Entertainment Digital Credit: 10% off - Was \$60 Now \$54". In the small sum with a large hedonic discount condition, the aggregated discount depth was smaller ($10\% + 20\% = 30\%$) but the discount on the hedonic product was larger (20%): "E-Book/Textbook Credit: 10% off - Was \$40 Now \$36 + Entertainment Digital Credit: 20% off - Was \$60 Now \$48". The final price in the two conditions was identical (\$84).

After viewing the bundle price information, participants responded to three measures identical to those used in earlier studies: perceived discount depth, purchase intention ($\alpha = .92$), and perceived complementarity between the two products ($\alpha = .94$). We also included a measure to verify that the entertainment digital credit [e-book/textbook credit] was perceived as more hedonic [utilitarian]. Specifically, participants indicated the extent to which they considered each of the product as hedonic versus utilitarian on a 9-point scale (1 = definitely utilitarian, 9 = definitely hedonic). Lastly, participants reported their demographic information.

6.2. Results and Discussion

6.2.1. Perceived Product Nature

As intended, a paired samples t-test revealed that the entertainment digital credit (vs. e-book/textbook credit) was perceived as more hedonic ($M_{\text{entertainment}} = 6.95$, $SD = 2.11$; $M_{\text{ebook}} = 2.46$, $SD = 1.83$; $t(221) = 20.90$, $p < .001$).

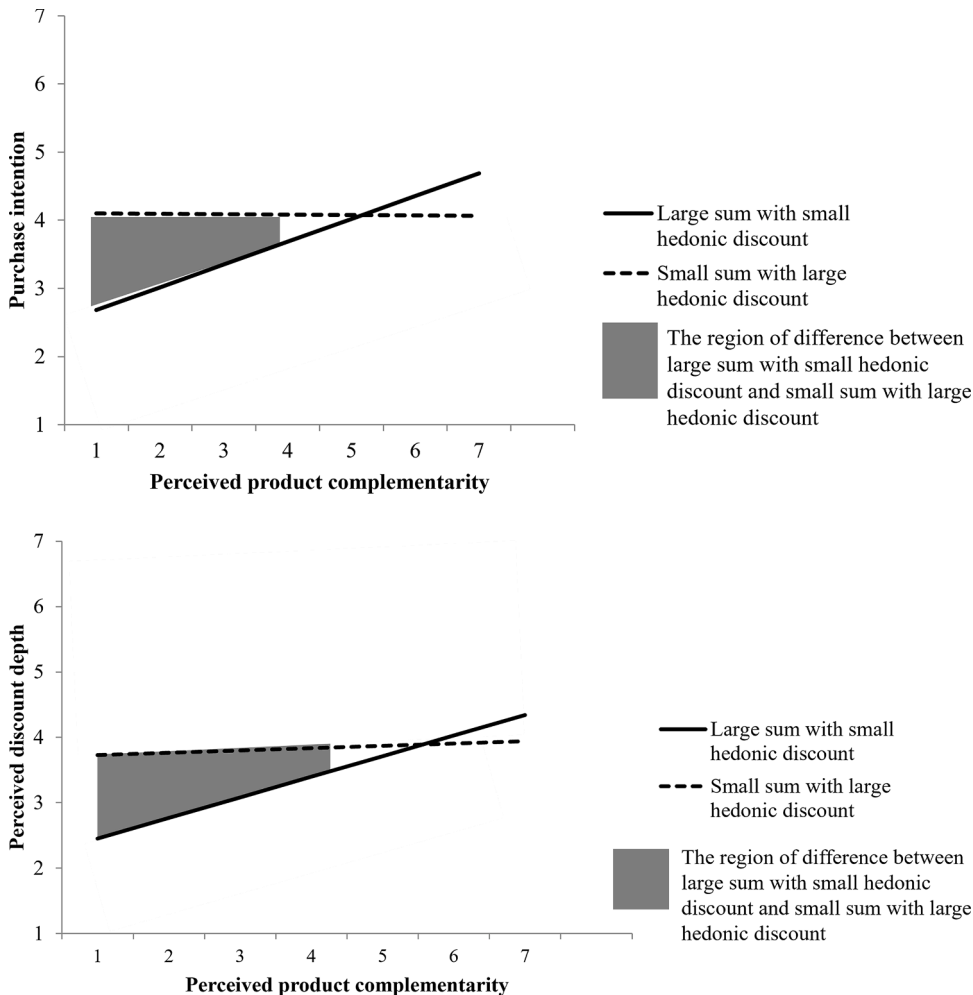
6.2.2. Purchase Intention

We dummy coded the two aggregated discount depth conditions: 1 = large sum with a small hedonic discount, and 0 = small sum with a large hedonic discount. We then regressed purchase intention on aggregated discount depth, perceived product complementarity, and their interaction term. A significant interaction between aggregated discount depth and perceived complementarity was observed ($F(1, 218) = 6.14, p = .014$). Johnson-Neyman analysis revealed that when the perceived product complementarity score was less than or equal to 3.92, participants were more willing to purchase the products when a small sum with a large hedonic discount was offered, compared to when a large sum with a small hedonic discount was offered ($b_{JN} = -.43, SE = .22, t(218) = 1.97, p = .05$). However, the difference between the two conditions was no longer significant when the perceived product complementarity score was greater than 3.92.

The results indicate that when perceived product complementarity is low, the overweighing of the discount depth for the hedonic product can override and reverse the effect of aggregated discount depth. Specifically, unlike the results from earlier studies, participants showed higher purchase intention when the aggregated discount depth was small (vs. large) because a larger discount depth was offered for the hedonic product. Interestingly, this reflects another form of the base price neglect phenomenon, occurring when low product complementarity leads consumers adopt a topical mental account. In contrast, when perceived product complementarity is high, consumers adopt a comprehensive mental account, leading them to be less susceptible to biases—neither the motivational bias (i.e., overweighing the discount of the hedonic product) nor the cognitive bias (i.e., overreliance on aggregated discount depth).

6.2.3. Perceived Discount Depth

We regressed perceived discount depth on aggregated discount depth, perceived product complementarity, and their interaction term. A significant interaction between aggregated discount depth and perceived product complementarity was observed ($F(1, 218) = 6.07, p = .015$). The Johnson-Neyman technique revealed that when the perceived product complementarity score was less than or



Figs. 8 and 9. The effect of aggregated discount depth on purchase intention (Fig. 8) and perceived discount depth (Fig. 9), moderated by perceived product complementarity and hedonic motivation (study 3)

equal to 4.27, participants misperceived greater savings when a small sum with a large hedonic discount (vs. large sum with a small hedonic discount) was offered ($b_{JN} = .36$, $SE = .18$, $t(218) = -1.97$, $p = .05$). In other words, the usual effect of aggregated discount depth on perceived discount depth (H2) was reversed. However, when the perceived product complementarity score exceeded 4.27, the difference between the two aggregated discount depth conditions was no longer reliable (see Figs. 8 and 9). The results indicate that participants' perception of savings is more influenced by the discount of the hedonic product than by the aggregated discount depth across both products when the products are perceived to be less complementary. However, increasing perceived complementarity attenuates this misperception caused by motivational overweighting of the discount on the hedonic product.

6.2.4. Moderated Mediation

Finally, we conducted a moderated mediation analysis (Hayes 2013, model 7, 10,000 bootstrapped samples) to test whether the effect of aggregated discount depth on purchase intention was mediated by perceived discount depth among those who perceived the products to be less complementary, but not among those who perceived them as more complementary. The analyses revealed that the indirect effect of the aggregated discount depth on purchase intention through perceived discount depth was significant among participants who perceived the products as less complementary (when complementarity score = 2.0: $b = -.65$, Boot SE = .22, 95% CIs: [-1.089 to -.239]; when complementarity score = 4.0: ($b = -.29$, Boot SE = .12, 95% CIs: [-.524 to -.055])). However, the indirect effect was not significant among participants who perceived the products as more complementary (when complementarity score = 5.0: $b = -.10$, Boot SE = .15, 95% CIs: [-.409 to 0.204]). The index of moderated mediation was significant ($b = .18$, Boot SE = .09, 95% CIs: [.007 to .371]), indicating that the indirect effects measured at different levels of perceived complementarity differed significantly.

7. Study 4

To further explore the process underlying the moderating effect of product complementarity, we compared the effect of complementarity (i.e., comprehensive mental account) with the analytical processing style associated with consumers' prevention (vs. promotion) orientation. Specifically, in study 4, we tested whether prevention-focused individuals are less likely to be influenced by aggregated discount depth, even when product complementarity is low. In contrast, promotion-focused individuals were expected to be influenced by aggregated discount depth when product complementarity is low, but not when the complementarity is high (H4).

7.1. Design and Procedure

Five hundred and thirteen U.S participants were recruited from Amazon Mechanical Turk ($M_{age} = 39.33$ years; 250 males, 252 females, 11 others). They were randomly assigned to one of four conditions in a 2 (aggregated discount depth: large sum vs. small sum) \times 2 (complementarity: high vs. low) between-subjects design. Participants viewed the product descriptions from the Supplementary study (i.e., the follow-up of Study 1-1) (see Web Appendix B), but with a different aggregated discount depth manipulation (i.e., slightly different base prices and discount rates). Specifically, in the small sum condition, the products were priced as "25% off \$100 \$75 + 10% off \$50 \$45" (i.e., the sum of discount rates was 35%). In the large sum condition, the price was "15% off \$100 \$85 + 30% off \$50 \$35" (i.e., the sum of discount rates was 45%).

Participants then responded to the same dependent measures used in earlier studies: perceived discount depth and purchase intention ($\alpha = .97$). They also completed the complementarity manipulation checks from previous studies ($\alpha = .94$). Next, participants completed an 11-item Chronic Regulatory Focus Scale on a five-point scale (e.g., 1 = never or seldom, 5 = very often; Higgins, 2001; see Web Appendix C for details). Finally, participants answered demographics questions.

7.2. Results and Discussion

7.2.1. Manipulation Check

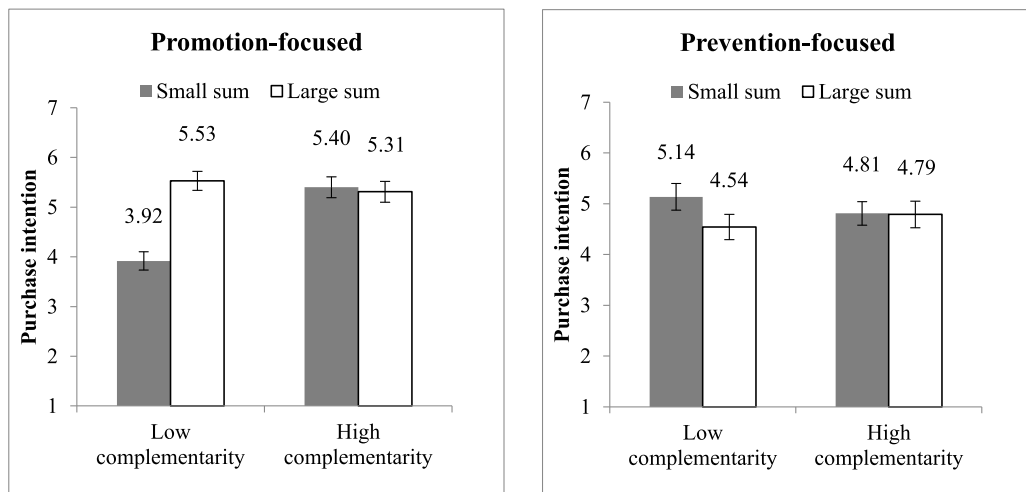
As intended, participants perceived the products as significantly more complementary in the high (vs. low) complementarity condition ($M_{high} = 5.59$, $SD = 1.17$; $M_{low} = 4.07$, $SD = 2.13$; $F(1, 491) = 97.26$, $p < .001$).

7.2.2. Regulatory Focus

Following the method suggested by Higgins, 2001, the prevention focus score ($M = 2.97$, $SD = .89$, $\alpha = .77$) was subtracted from the promotion focus score ($M = 3.21$, $SD = .81$, $\alpha = .75$). Participants with a difference score greater than zero were identified as promotion-focused (317 participants), while those with a difference score less than or equal to zero were identified as prevention-focused (196 participants). It is important to note that neither the aggregated discount depth manipulation ($p > .71$) nor the complementarity manipulation ($p > .21$) had any effect on participants' chronic regulatory focus.

7.2.3. Purchase Intention

We conducted a three-way ANOVA with aggregated discount depth, complementarity, and chronic regulatory focus as predictors. A significant three-way interaction effect on purchase intention was observed ($F(1, 505) = 12.66$, $p < .001$). Consistent with H4, a significant two-way interaction between aggregated discount depth and complementarity was observed among promotion-focused participants ($F(1, 505) = 18.52$, $p < .001$). However, this two-way interaction was not significant among prevention-focused participants ($F(1, 505) = 1.30$, $p < .25$). We followed up on the significant two-way interaction among promotion-focused participants and observed the primary relationship between complementarity and aggregated discount depth (i.e., H1 among promotion-focused



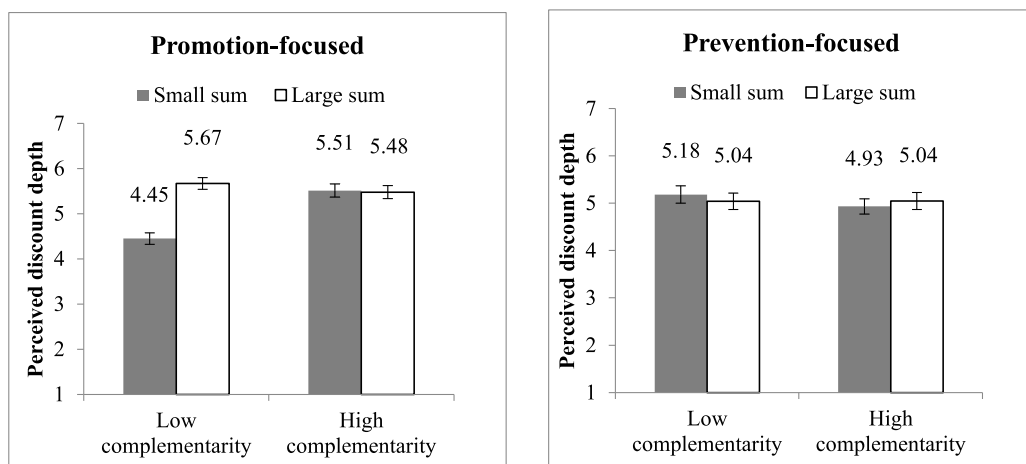
Figs. 10-11. The effect of aggregated discount depth on purchase intention (Fig. 10 left side: promotion-focused individuals / Fig. 10 right side: prevention-focused individuals), moderated by product complementarity and regulatory focus (study 4).

participants). Specifically, when product complementarity was low, promotion-focused participants were more willing to purchase the products with a large (vs. small) aggregated discount depth ($M_{\text{small}} = 3.92$ vs. $M_{\text{large}} = 5.53$, $F(1, 505) = 37.32$, $p < .001$). However, this difference was not found when product complementarity was high ($M_{\text{small}} = 5.40$ vs. $M_{\text{large}} = 5.31$, $F(1, 505) < 1$) (see Fig. 10).

In sum, among promotion-focused participants, the effect of aggregated discount depth was observed when product complementarity was low but not when high. In contrast, among prevention-focused participants, who tend to engage in analytical processing, this effect was not observed regardless of the level of product complementarity. Similar to high perceived product complementarity, prevention orientation—associated with analytical processing—attenuated consumers' tendency to overly rely on aggregated discount depth.

7.2.4. Perceived Discount Depth

We conducted another three-way ANOVA with the same three predictors and found a significant three-way interaction on perceived discount depth ($F(1, 505) = 11.56$, $p < .001$). Among promotion-focused participants, a significant two-way interaction between aggregated discount depth and complementarity was observed ($F(1, 505) = 20.91$, $p < .001$). Follow-up planned contrasts confirmed that, among promotion-focused participants, the large (vs. small) aggregated discount depth condition was perceived to offer a greater discount ($M_{\text{small}} = 4.45$ vs. $M_{\text{large}} = 5.67$, $F(1, 505) = 32.99$, $p < .001$) when product complementarity was low. However, this difference was not found when complementarity was high ($M_{\text{small}} = 5.51$ vs. $M_{\text{large}} = 5.48$, $F(1, 505) < 1$). In contrast, the two-way interaction between aggregated discount depth and complementarity was not observed among prevention-focused participants ($F(1, 505) < 1$) (see Fig. 11).



Figs. 12-13. The effect of perceived discount depth (Fig. 12 left side: promotion-focused individuals / Fig. 13 right side: prevention-focused individuals), moderated by product complementarity and regulatory focus (study 4)

7.2.5. Moderated Moderated Mediation

We conducted a moderated moderated mediation analysis (Hayes, 2013; PROCESS model 11, 10,000 bootstrap samples). The analysis included aggregated discount depth as the independent variable, purchase intention as the dependent variable, perceived discount depth as the mediator, and complementarity and chronic regulatory focus as two moderators.

Consistent with our expectations, among promotion-focused participants, perceived discount depth mediated the effect of aggregated discount depth on purchase intention when complementarity was low ($b = 1.32$, Boot SE = .28, 95% CIs: [.7846, 1.8908]), but not when complementarity was high ($b = -.04$, Boot SE = .20, 95% CIs: [-.4400 to .3477]). The index of moderated mediation was significant for promotion-focused individuals ($b = -1.36$, Boot SE = .35, 95% CIs: [-2.0575 to -.7041]), indicating that the two indirect effects at different levels of complementarity differed significantly. In contrast, among prevention-focused participants, perceived discount depth did not mediate the effect of aggregated discount depth on purchase intention, regardless of whether complementarity was low or high. The index of moderated mediation was not significant for prevention-focused participants ($b = .28$, Boot SE = .25, 95% CIs: [-.2129, .7680]). Finally, the overall index of moderated moderated mediation was significant ($b = -1.64$, Boot SE = .43, 95% CIs: [-2.5260 to -.8178]), confirming that the two moderated mediation effects at different levels of regulatory focus differed significantly.

In sum, consistent with H4, study 4 showed that the effect of aggregated discount depth was attenuated among prevention-focused participants, even when product complementarity was low. The results suggest that the processing styles triggered by product complementarity and those associated with prevention orientation are similar. Both serve the same function—overcoming consumers' overreliance on aggregated discount depth by encouraging more complex evaluations that incorporate base price information.

8. General Discussion

Past research has consistently shown that consumers tend to neglect base prices and focus primarily on discount depth when evaluating price attractiveness (Chen et al. 2012; Chen & Rao, 2007; DelVecchio et al. 2007; Estelami 1999; Guha et al. 2018; Kruger and Vargas 2008). However, we proposed that this tendency would primarily occur when consumers evaluate products recommended based on basket co-occurrence, but not when they evaluate complementary products (H1). In other words, we introduced product complementarity as a novel moderator for consumers' tendency to neglect base price. Evidence supporting our proposition was found across seven studies, which tested a variety of product categories and examined both consumers' purchase intentions (studies 1-1 to 1-3, study 3 and study 4) and their actual purchase decisions (study 2). Our findings showed that when products were recommended based on basket co-occurrence (i.e., low in perceived complementarity), participants' purchase decisions were driven by aggregated discount depth. Specifically, participants showed a higher intention to purchase the products when the aggregated discount depth was large (vs. small), even though the final price was identical across conditions. In contrast, when the recommended products were complementary, participants' overreliance on discount depth diminished, supporting our hypothesis that product complementarity shifts consumers away from focusing solely on discount depth.

As the underlying mechanism, we proposed that product complementarity activates a comprehensive (vs. topical) mental account, which considers all available information—including discount depths and base prices of all products, thereby attenuating consumers' overreliance on discount depth. Studies 3 and 4 were designed to test this proposed mechanism. In study 3, we examined whether product complementarity attenuates another type of processing bias, providing further evidence that product complementarity activates a comprehensive mental account, which is less susceptible to processing biases. Due to the motivation to justify hedonic purchases, participants preferred recommended products when a large (vs. small) discount was applied to a hedonic product rather than to a utilitarian product, even when the aggregated discount depth was small (vs. large). That is, the motivational effect reversed the usual effect of aggregated discount depth on consumers' purchase decisions. Importantly, this reversal was observed only when product complementarity was low. Although the motivation to justify the hedonic purchases was strong enough to reverse the usual effect of discount depth, increasing perceived product complementarity eliminated this motivation-driven processing bias. In sum, whether the bias was cognitive—driven by aggregated discount depth—or motivational—driven by the need to justify a hedonic purchase—both biases were mitigated when product complementarity was high. These findings indicate that increasing product complementarity activates a comprehensive mental account that integrates all available information, preventing consumers from being influenced by any processing biases. Our results are consistent with the original concept of a comprehensive account introduced by Kahneman and Tversky (1984).

In study 4, we tested whether another way of activating a comprehensive evaluation approach—namely, the analytical ability associated with prevention (vs. promotion) orientation—helps attenuate consumers' reliance on discount depth. Promotion-focused participants exhibited patterns consistent with our primary hypothesis (H1). Specifically, they overly relied on aggregated discount depth when evaluating recommendations based on basket co-occurrence. However, this overreliance was attenuated when evaluating recommendations based on usage complementarity. In contrast, prevention-focused participants were not affected by aggregated discount depth, even when product complementarity was low. The results suggest that by encouraging analytical processing, prevention-orientation (vs. promotion orientation) substituted for the role of product complementarity that activates a comprehensive account. In other words, the comprehensive account activated by product complementarity mirrors the analytical processing style associated with prevention-orientation, enabling consumers to incorporate both base price information and discount depth in their price evaluations.

8.1. Theoretical and Practical Contributions

Our research contributes to both theory and practice in several ways. First, we advance the literature on base price neglect by introducing product complementarity as a novel moderator. Our research demonstrates that product complementarity (vs. basket co-occurrence) activates a comprehensive (vs. topical) approach to evaluating given sales offers, thereby attenuating the consumer tendency to neglect the base price. In addition, we introduce two other moderators for the base price neglect phenomenon: regulatory focus and hedonic/utilitarian nature of products. Similar to moderators associated with individuals' analytical ability examined in past research (e.g., need for cognition or numeracy; Chatterjee et al. 2000; Guha et al., 2018; see Table 1), we find that an analytical processing style associated with a prevention orientation reduces the impact of discount depth on consumers' purchase decisions. We also observe that when a hedonic product and a utilitarian product are recommended together, and the discount depth applied to the former is greater than that applied to the latter, the effect of aggregated discount depth can be attenuated or even reversed. Importantly, this motivational effect, which is strong enough to reverse the usual discount depth effect, can also be attenuated by increasing perceived product complementarity. In other words, all types of processing biases—regardless of whether their source is cognitive or motivational—are alleviated by increasing perceived product complementarity, as it activates a comprehensive mental account that engages consumers in complicated calculations using base price information.

The theoretical contributions discussed above are directly tied to practical contributions. First, although base price neglect is a prevalent phenomenon with substantive implications for how consumers evaluate price information, the moderators examined in past research have been limited to factors that are theoretically important but lack practical utility (e.g., individual differences in need for cognition or numeracy) or require additional costs (e.g., offering monetary incentive (see Table 1 for a summary of moderators). In contrast, the current research introduces a moderator that is closely tied with managerial context—complementarity between products. As a result, our findings offer managerial insights on how to formulate an optimal mix of products to recommend, considering both complementarity between products and discount depth offered. Second, while past research on base price neglect emphasizes the importance of how discount depth is framed (e.g., Chen & Rao, 2007; Estelami 1999; Guha et al. 2018; Kruger and Vargas 2008), our research suggests such framing efforts may be redundant for complementary products. Marketers may only need to carefully consider how to frame the discount depth when recommending non-complementary, basket co-occurring products. This consideration includes whether the aggregated discount depth is large enough; and whether the recommendation consists of both a hedonic product and a utilitarian product (in which case the relative discount depth applied to the two products may matter more than the aggregated discount depth).

Our research also contributes to the bundling literature that explores the impact of bundle complementarity on consumers' bundle evaluations (e.g., Gaeth et al. 1991; Harlam et al. 1995; Sheng and Pan 2009; Yan and Bandyopadhyay 2011). First, while past research mostly examined how bundle complementarity increases evaluations through a positive spillover effect between bundle components (e.g., Sheng and Pan 2009) or by mitigating negative price-quality inferences (Sheng et al., 2007), none to our knowledge, has explored the impact of bundle complementarity on consumers' tendency to neglect base prices when processing bundle price information. Second, few past studies that examined how bundle complementarity activates a comprehensive (vs. topical) mental account focused on exploring whether consumers categorize two products as a single entity or separate entities—that is, the joint (vs. separate) categorization aspect of a comprehensive (vs. topical) account (Bonini and Rumiati 1996, 2002; Sheng et al., 2007). However, in the context of our study, it is unclear whether consumers evaluating non-complementary recommendations consider two products as separate entities or one entity, because aggregating the discount depths across two products may indicate considering them as a single entity. In other words, the categorization aspect of a comprehensive mental account is insufficient to explain our effects. We demonstrate the *analytical* aspect of a comprehensive account that engages consumers in complex estimations using all available information, which past research on bundling has not explored.

Again, this theoretical contribution to the bundling literature directly leads to managerial implications. While most past literature on bundling has suggested the positive effect of bundle complementarity on generating sales (Gaeth et al. 1991; Harlam et al. 1995; Sheng and Pan 2009; Yan and Bandyopadhyay 2011), it has been relatively silent regarding how to sell non-complementary products. Nevertheless, non-complementary product recommendations are increasingly observed in marketplaces based on customers' browsing history and purchase cycles (e.g., Amazon's "customers who viewed items in your purchase history also viewed" and BestBuy's "recently viewed"). For non-complementary recommendations, our findings suggest that how discount depth is framed is critical to generating sales. Specifically, framing the offer in a way that increases aggregated discount depth can be an effective strategy for boosting sales of non-complementary products. On the other hand, policymakers can consider enforcing regulations that require retailers to highlight the final price or absolute amount discounted (e.g., by using larger text size) to help consumers overcome this processing bias.

8.2. Future Research Directions

One possible avenue for future research is to explore when a comprehensive (vs. topical) mental account is not activated, even when perceived product complementarity is high (vs. low). For instance, are there any product categories that prevent the activation of a comprehensive mental account, even when perceived product complementarity is high? Specifically, if the overall recommendation is perceived as hedonic (e.g., fashion goods), it is possible that consumers do not activate a comprehensive account, even when the products are highly complementary (i.e., dress and jewelry). Instead, their purchase decision may be driven by factors that justify their hedonic purchase better, such as the presence of large discount depths. In particular, if the hedonic products are expensive (e.g., luxury hedonic products), consumers may be even more motivated to neglect base prices and focus on discount rates—that is, they may be

inclined not to adopt a comprehensive mental account. On the other hand, there may be certain groups of consumers who would adopt a comprehensive (vs. topical) account, even when perceived product complementarity is low (vs. high). For instance, consumers with constrained budgets may engage in more detailed calculations using both discount rates and base prices, even when products are perceived to be non-complementary. Alternatively, consumers with high income levels may be less likely to adopt a comprehensive mental account. This is because consumers with high incomes may perceive the extra cognitive effort required to process base price information and conduct comprehensive calculations as not worth the effort compared to the additional savings gained from such calculations.

Future research can explore factors that influence perceived product complementarity in marketing practice, which could, in turn, influence the aggregated discount depth effect. For instance, providing an option to purchase the recommended products separately, rather than mandating them to buy them together, could lower perceived product complementarity and in turn change the aggregated discount depth effect. For instance, the decreased perceived complementarity may reduce consumers' focus on the effect of *aggregated* discount depth as the products are not considered together, while exacerbating the reliance on *individual* discount depth. In particular, consumers may focus on the discount depth of a more desired product, which may result in increased sales of that product, but not the other product. Alternatively, the lowered perceived complementarity may enhance the effect of aggregated discount depth as we observed in our studies, which may increase the sales of both products as a bundle when the aggregated discount depth is large. In our studies, we did not provide the option to buy the recommended products separately. However, it is not difficult to find recommendations with such an option in real retail contexts. For example, Amazon often suggests bundles that are "frequently bought together" and does not require consumers to purchase all items in the bundle at once. Future research can investigate whether such an opt-out option could decrease perceived product complementarity.

In addition, future research can investigate factors that may attenuate or reverse the effect of aggregated discount depth, as observed for recommendations composed of both hedonic and utilitarian products. For instance, when one product is the dominant primary constituent of a recommendation compared to the other component (e.g., a recommendation consisting of a refrigerator and an icemaker; Chakravarti et al. 2002), the price of the primary product is expected to be significantly larger than that of the peripheral product. In such cases, consumers may pay more attention to the discount depth applied to the primary product, which may drive consumers' multi-product purchase decision, rather than the aggregated discount depth. Furthermore, we expect this to occur when perceived product complementarity is low, as adopting a topical account would increase consumers' discrete focus on the primary product.

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Declaration of Competing Interest

Jungsil (David) Choi declares that he has no conflict of interest. Hyun Youn Park declares that she has no conflict of interest.

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Supplementary materials

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References

- Basu, S., & Ng, S. (2021). 100 a month or 1,200 a year? Regulatory focus and the evaluation of temporally framed attributes. *Journal of Consumer Psychology, 31*(2), 301–318.
- Bettman, J. R., Johnson, E. J., & Payne, J. W. (1990). A componential analysis of cognitive effort in choice. *Organizational behavior and human decision processes, 45*(1), 111–139.
- Bonini, N., & Rumiati, R. (1996). Mental accounting and acceptance of a price discount. *Acta Psychologica, 93*(1-3), 149–160.
- Bonini, N., & Rumiati, R. (2002). Acceptance of a price discount: The role of the semantic relatedness between purchases and the comparative price format. *Journal of Behavioral Decision Making, 15*(3), 203–220.
- Chakravarti, D., Krish, R., Paul, P., & Srivastava, J. (2002). Partitioned presentation of multicomponent bundle prices: Evaluation, choice and underlying processing effects. *Journal of Consumer Psychology, 12*(3), 215–229.
- Chatterjee, S., Heath, T. B., Milberg, S. J., & France, K. R. (2000). The differential processing of price in gains and losses: The effects of frame and need for cognition. *Journal of behavioral decision making, 13*(1), 61–75.
- Chen, H., Marmorstein, H., Tsiros, M., & Rao, A. R. (2012). When more is less: The impact of base value neglect on consumer preferences for bonus packs over price discounts. *Journal of Marketing, 76*(4), 64–77.

- Chen, H., & Rao, A. R. (2007). When two plus two is not equal to four: Errors in processing multiple percentage changes. *Journal of Consumer Research*, 34(3), 327–340.
- Chiambaretto, P., & Dumez, H. (2012). The role of bundling in firms' marketing strategies: a synthesis. *Recherche et Applications en Marketing (English Edition)*, 27(2), 91–105.
- Choi, J., Li, Y. J., Rangan, P., Chatterjee, P., & Singh, S. N. (2014). The odd-ending price justification effect: The influence of price-endings on hedonic and utilitarian consumption. *Journal of the Academy of Marketing Science*, 42(5), 545–557.
- Choi, J., Madhavaram, S. R., & Park, H. Y. (2020). The role of hedonic and utilitarian motives on the effectiveness of partitioned pricing. *Journal of Retailing*, 96(2), 251–265.
- Choi, J., & Park, H. Y. (2024). How consumers with hedonic (vs utilitarian) purchase motive use item-price (vs price-item) presentation order as a mechanism to justify their hedonic purchase. *European Journal of Marketing*, 58(5), 1352–1386.
- DelVecchio, D., Krishnan, H. S., & Smith, D. C. (2007). Cents or percent? The effects of promotion framing on price expectations and choice. *Journal of Marketing*, 71(3), 158–170.
- Dhar, R., & Wertenbroch, K. (2000). Consumer choice between hedonic and utilitarian goods. *Journal of Marketing Research*, 37(1), 60–71.
- Estelami, H. (1999). Consumer savings in complementary product bundles. *Journal of Marketing Theory and Practice*, 7(3), 107–114.
- Foubert, B., & Gijbrecchts, E. (2007). Shopper response to bundle promotions for packaged goods. *Journal of Marketing Research*, 44(4), 647–662.
- Gaeth, G. J., Levin, I. P., Chakraborty, G., & Levin, A. M. (1991). Consumer evaluation of multi-product bundles: An information integration analysis. *Marketing Letters*, 2(1), 47–57.
- Guha, A., Biswas, A., Grewal, D., Verma, S., Banerjee, S., & Nordfält, J. (2018). Reframing the discount as a comparison against the sale price: does it make the discount more attractive? *Journal of Marketing Research*, 55(3), 339–351.
- Gultinan, J. P. (1987). The price bundling of services: A normative framework. *Journal of Marketing*, 51(2), 74–85.
- Kohan, S. (2023). *Black friday and cyber monday record sales: by the numbers*. <https://www.forbes.com/sites/shelleykohan/2023/11/30/black-friday-and-cyber-monday-record-sales-by-the-numbers/?sh=afaced2aba2d>.
- Harlam, B. A., Krishna, A., Lehmann, D. R., & Mela, C. (1995). Impact of bundle type, price framing and familiarity on purchase intention for the bundle. *Journal of Business Research*, 33(1), 57–66.
- Hayes, A. F. (2013). Multilevel mediation analysis. In *Workshop presented at the annual meeting of the association for psychological science, washington, dc*, 28 p. (2017). Retrieved on February.
- Heath, T. B., Chatterjee, S., & France, K. R. (1995). Mental accounting and changes in price: The frame dependence of reference dependence. *Journal of Consumer Research*, 22(1), 90–97.
- Heeler, R. M., Nguyen, A., & Buff, C. (2007). Bundles= discount? Revisiting complex theories of bundle effects. *Journal of Product & Brand Management*, 16(7), 492–500.
- Higgins, E. T. (1999). Promotion and prevention as a motivational duality: Implications for evaluative processes. In S. Chaiken, & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 503–525). The Guilford Press.
- Higgins, E. T. (2001). Promotion and prevention experiences: Relating emotions to nonemotional motivational states. In J. P. Forgas (Ed.), *Handbook of affect and social cognition* (pp. 186–211). Lawrence Erlbaum Associates Publishers.
- Holbrook, M. B., & Lehmann, D. R. (1981). Allocating discretionary time: Complementarity among activities. *Journal of Consumer Research*, 7(4), 395–406.
- Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American psychologist*, 39(4), 341.
- Kivetz, R., & Zheng, Y. (2017). The effects of promotions on hedonic versus utilitarian purchases. *Journal of Consumer Psychology*, 27(1), 59–68.
- Khan, U., & Dhar, R. (2010). Price-framing effects on the purchase of hedonic and utilitarian bundles. *Journal of Marketing Research*, 47(6), 1090–1099.
- Kruger, J., & Vargas, P. (2008). Consumer confusion of percent differences. *Journal of Consumer Psychology*, 18(1), 49–61.
- Lee, K., Choi, J., & Li, Y. J. (2014). Regulatory focus as a predictor of attitudes toward partitioned and combined pricing. *Journal of Consumer Psychology*, 24(3), 355–362.
- MacKenzie, I., Meyer, C., & Noble, S. (2013). How retailers can keep up with consumers. *McKinsey & Company*, 18(1), 1–10.
- Manchanda, P., Ansari, A., & Gupta, S. (1999). The “shopping basket”: A model for multicategory purchase incidence decisions. *Marketing science*, 18(2), 95–114.
- Mishra, A., & Mishra, H. (2011). The influence of price discount versus bonus pack on the preference for virtue and vice foods. *Journal of Marketing Research*, 48(1), 196–206.
- Okada, E. M. (2005). Justification effects on consumer choice of hedonic and utilitarian goods. *Journal of Marketing Research*, 42(1), 43–53.
- Rajesh, A. M., Vanaik, G., & McLymore, A. (2023). *Amazon prime day sales rise as deep discounts tempt inflation-hit shoppers*. <https://www.reuters.com/technology/amazon-prime-day-sales-rise-deep-discounts-tempt-inflation-hit-customers-2023-07-12/>.
- Roy, R., & Phau, I. (2014). Examining regulatory focus in the information processing of imagery and analytical advertisements. *Journal of Advertising*, 43(4), 371–381.
- Sheng, S., & Pan, Y. (2009). Bundling as a new product introduction strategy: The role of brand image and bundle features. *Journal of Retailing and Consumer Services*, 16(5), 367–376.
- Sheng, S., Parker, A. M., & Nakamoto, K. (2007). The effects of price discount and product complementarity on consumer evaluations of bundle components. *Journal of Marketing Theory and Practice*, 15(1), 53–64.
- Strahilevitz, M., & Myers, J. G. (1998). Donations to charity as purchase incentives: How well they work may depend on what you are trying to sell. *Journal of consumer research*, 24(4), 434–446.
- Tmall Taobao World. (2023). *TaobaoTmall 11.11 global shopping festival returns with launch of new cross-border shopping service brand*. <https://www.prnewswire.com/apac/news-releases/taobao-tmall-11-11-global-shopping-festival-returns-with-launch-of-new-cross-border-shopping-service-brand-301965598.html#:~:text=The%20unit%20also%20announced%20the,options%20and%20dedicated%20customer%20service>.
- Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral decision making*, 12(3), 183–206.
- Trope, Y., & Liberman, N. (2000). Temporal construal and time-dependent changes in preference. *Journal of personality and social psychology*, 79(6), 876.
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological review*, 117(2), 440.
- Yan, R., & Bandyopadhyay, S. (2011). The profit benefits of bundle pricing of complementary products. *Journal of Retailing and Consumer Services*, 18(4), 355–361.