



# Anxious Altruism: Virtue Signaling Mediates the Impact of Attachment Style on Consumers' Green Purchase Behavior and Prosocial Responses

Muhammad Junaid Shahid Hasni<sup>1</sup> · Faruk Anıl Konuk<sup>2</sup> · Tobias Otterbring<sup>3</sup>

Received: 21 November 2023 / Accepted: 11 May 2024  
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## Abstract

Virtue signaling serves to express moral and ethical values publicly, showcasing commitment to social and sustainable ideals. This research, conducted with non-WEIRD samples to mitigate the prevalent WEIRD bias (i.e., the tendency to solely rely on samples from Western, educated, industrialized, rich, and democratic societies), examines whether the scarcely studied virtue-signaling construct mediates the influence of consumers' attachment anxiety (vs. avoidance) on their green purchase behavior and prosocial responses. Drawing on attachment theory and the emerging virtue-signaling literature, the current work reports the results from three studies ( $N_{\text{total}} = 898$ ) in which consumers' attachment patterns were not only measured, as in most prior related research, but also manipulated. Study 1 confirmed the unique ability of measured attachment anxiety, but not attachment avoidance, to predict consumers' green purchase behavior and prosocial tendencies, with virtue signaling mediating these links. Study 2 manipulated participants' attachment patterns, finding further support for the mediating role of virtue signaling between attachment anxiety (vs. avoidance) and these dependent variables. Study 3 provided a more nuanced account for our virtue-signaling conceptualization by documenting that self-oriented, but not other-oriented, virtue signaling mediated the link between attachment anxiety and both our key outcomes in public contexts. From a managerial viewpoint, these findings indicate that anxiously attached consumers constitute a potentially lucrative segment for companies seeking to expand their market share of sustainable and ethically produced products.

**Keywords** Attachment style · Attachment anxiety · Attachment avoidance · Virtue signaling · Self-oriented virtue signaling · Green consumption · Green purchase behavior · Prosocial behavior

## Introduction

Concerns and moral aspects linked to environmental damage are commonly tied to the production, promotion, and disposal of commodities (Kilbourne & Beckmann, 1998; Schultz et al., 2023; Wu & Yang, 2018). People who

purchase and use green products tend to be seen as opinion leaders, careful shoppers, and brand loyal customers as well as more environmentally aware, sustainable, and virtuous (Abeliotis et al., 2010; Folwarczny et al., 2023; Jain & Kaur, 2006; Shrum et al., 1995). The demand for environmentally friendly products and eco-sensible consumer conduct is significant within a society marked by soaring environmental challenges and sustainability concerns (Birgelen et al., 2009; Costa et al., 2021; Wallace & Buil, 2023).

Attachment theory has been increasingly acknowledged as an insightful source to explain consumption-related phenomena (David et al., 2020; Gasiorowska et al., 2022; Pepping et al., 2015), including the link between attachment styles and green consumption values (Folwarczny & Otterbring, 2021) and various ethical codes of conduct (Albert & Horowitz, 2009). According to Bowlby (1982), attachment theory posits that infants learn about the world through interactions with primary caregivers, seeking comfort in stressful situations. These interactions can lead to

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✉ Tobias Otterbring  
tobias.otterbring@uia.no

Muhammad Junaid Shahid Hasni  
muhammad.hasni@unitn.it

Faruk Anıl Konuk  
fkonuk@sakarya.edu.tr

<sup>1</sup> Department of Economics and Management, University of Trento, Trento, Italy

<sup>2</sup> Department of Business Administration, Sakarya Business School, Sakarya University, Sakarya, Türkiye

<sup>3</sup> Department of Management, School of Business and Law, University of Agder, Kristiansand, Norway

secure, avoidant, or anxious attachment styles based on the consistency of closeness and caregiver reactions (Ainsworth et al., 2015). Studies, for instance, have connected attachment styles to advertisement responses (David & Bearden, 2017) and aspects linked to brand impressions, brand trust, and brand loyalty, as well as anti-brand actions after ending a relationship with a brand (Bidmon, 2017; Frydman & Tena, 2023; Mende et al., 2013; Swaminathan et al., 2009; Thomson et al., 2012). Moreover, attachment styles have been linked to gift-giving perceptions (Nguyen & Munch, 2011, 2014; Rippé et al., 2019), consumers' customized price perceptions (David et al., 2017), and a wide array of loyalty-linked responses, such as word-of-mouth, different facets of customer satisfaction, commitment, trust, involvement, and behavioral loyalty (Mende & Bolton, 2011; Park et al., 2019; Sidhu et al., 2023; Thomson & Johnson, 2006; Verbeke et al., 2020; Vlachos et al., 2010).

Prior literature has placed great emphasis on identifying the characterizing features of green consumers (Schlegelmilch et al., 1996; Shrum et al., 1995), as well as on effective marketing tactics that encourage and motivate consumers to purchase green products (Kronrod et al., 2012; Van Doorn & Verhoef, 2011). Similarly, previous research has examined how people perceive other consumers who purchase or choose green products (Mazar & Zhong, 2010) and how important such "green" aspects are for consumers' product evaluations (Gershoff & Frels, 2015).

Although attachment styles have been shown to predict a person's inclination to use goods and services sustainably (Folwarczny & Otterbring, 2021), research has yet to identify potential differences between attachment anxiety and attachment avoidance concerning green purchase behavior and other prosocial responses, with green purchase behavior referring to buying environmentally friendly products (Barbarossa & De Pelsmacker, 2016; Kim & Choi, 2005) and prosocial responses defined as behaviors that typically benefit others, within and beyond the consumption domain (Spielmann, 2021; Udo et al., 2016). Aligned with an emerging stream of literature linking attachment styles to prosocial behavior (for a review, see Shaver et al., 2019), we posit that consumers' attachment styles can aid in understanding green purchase behavior and prosocial responses. Shedding light on new predictors and mechanisms behind these phenomena is important to address the urgent need to tackle climate change (Johnstone & Tan, 2015; Otterbring & Folwarczny, 2024b; Yan et al., 2021) and elucidate the dynamics that shape cooperation and altruistic acts necessary to sustain societies (Henrich et al., 2010a, 2010b; Klein, 2017).

Using consumption to attain social approval within a given context is a widely recognized fact (Griskevicius et al., 2010; Konuk & Otterbring, 2024). In an age characterized by a pervasive reliance on ethical practices, individuals exhibit an augmented consciousness and a heightened focus

on cultivating and projecting their personal and social identities on moral grounds (Vaast, 2020). For instance, green purchase behavior has been shown to contribute to higher levels of social acceptance through its ability to impress others (Suki et al., 2021). Notably, purchasing green products is a display of being more virtuous, providing marketers with insights into the effectiveness of virtue-related cues when promoting such products (Spielmann, 2021). Indeed, virtuous displays can alter certain expectations in the general population, which might encourage the adoption of novel social standards (Westra, 2021), such as in the case of expressing one's moral principles openly by purchasing green products to show a deep care for the environment.

Virtue signaling is a relatively novel term (Kraft-Todd et al., 2020), which can be thought of as the public expression of opinions designed to exhibit the ethical righteousness of one's stance on a specific issue (Levy, 2021). Research has also discussed virtue signaling as an outward manifestation of moral principles, typically aimed at enhancing one's social standing within a given reference group (Berthon et al., 2021), sometimes summarized through the label, "moral grandstanding" (Loughran et al., 2023, p. 1043). Two of the most well-known operationalizations of virtue signaling define the virtue-signaling construct as (1) "symbolic demonstrations that can lead observers to make favorable inferences about the signaler's moral character" (Ok et al., 2021, p. 1635), and as (2) morality-related displays designed to deliberately signal virtue in public settings, where one's actions are widely visible to others, with these displays either serving to achieve intrinsic benefits (self-oriented) or to highlight virtuous codes of conduct to others (other-oriented; Wallace et al., 2020). In the current research, we build on these established definitions, which largely overlap in their substantive content apart from the distinction between self-oriented and other-oriented virtue signaling; a distinction we elaborate on in our own empirical work.

Drawing on attachment theory (Ainsworth et al., 2015; Bowlby, 1982; Shaver et al., 2019) and recent virtue-signaling conceptualizations (Berthon et al., 2021; Konuk & Otterbring, 2024; Ok et al., 2021; Wallace et al., 2020), we examine the mediating role of virtue signaling into the relationship between attachment styles and consumers' green purchase behavior as well as their more generic prosocial responses in public contexts. More precisely, we address the following four research questions (RQs):

**RQ1:** Are consumers with an anxious (vs. avoidant) attachment style more prone to exhibit **(a)** green purchase behavior, and **(b)** other prosocial responses?

**RQ2:** Are consumers with an anxious (vs. avoidant) attachment style more prone to engage in virtue signaling?

**RQ3:** Does virtue signaling mediate the presumed link between consumers' attachment styles and their **(a)** green purchase behavior, and **(b)** other prosocial responses?

**RQ4:** Is the presumed virtue-signaling mediation specific to consumers' self-oriented virtue signaling or does it also apply to other-oriented virtue signaling?

Our work differs from prior investigations in that we examine two distinct attachment styles (anxious vs. avoidant) alongside the virtue signaling construct in a unified model, while simultaneously moving beyond the practice of solely measuring attachment styles. Instead, we both measure and manipulate attachment patterns to demonstrate robustness, replicability, and generalizability of our focal findings.

Theoretically, our findings add to the literature by demonstrating a positive link between attachment anxiety, but not attachment avoidance, and (1) consumers' willingness to make green purchases, and (2) their inclination to display other prosocial behaviors beyond consumption, with (3) these relationships generally mediated by virtue signaling; yet (4) only for the self-oriented but not the other-oriented dimension of the virtue-signaling construct (Wallace et al., 2020). Because most research in this domain has typically used WEIRD samples (i.e., people from Western, educated, industrialized, rich, and democratic societies; Henrich et al., 2010a, 2010b), we complement prior work by gathering data from an under-explored part of the world. Accordingly, we collect data in a developing country (Pakistan), with such non-WEIRD samples representing 83% of the human population worldwide (UNCTAD, 2022). Selecting a non-WEIRD sample may increase the generalizability of our findings (Babalola et al., 2022; Game & Crawshaw, 2017; Muthukrishna et al., 2020), enhancing our understanding of human behavior to other parts of the world (Bartusevičius et al., 2020; Otterbring & Folwarczny, 2024a).

## Conceptual Background

### Attachment Styles and Consumer Behavior

Understanding the interplay between attachment styles and consumer responses is critical in psychology, marketing, and business ethics. Multiple studies have explored the role of attachment styles in shaping various aspects of consumer behavior. Still, the literature connecting attachment styles with consumer behavior through an ethical lens remains surprisingly scarce. A comprehensive review of the existing articles based on a systematic literature search, outlined in Table 1, reveals several notable gaps.

First, the existing body of research largely lacks empirical studies into the connection between attachment styles and ethical aspects of consumption. Our investigation aims to fill this gap, as we delve into the ethical dimensions of consumer responses, particularly in the context of green purchase behavior and other prosocial behaviors. In fact, of all the reviewed articles in Table 1, only one (3% of the

reviewed articles) has explicitly addressed ethical aspects and attachment styles (Albert & Horowitz, 2009), underscoring our novel contribution to this stream of research. It is critical to understand whether and how consumers' attachment styles can predict ethical buying responses for the purpose of encouraging responsible purchasing patterns (Koleva et al., 2014; Rostami et al., 2022). By using such insights, policymakers can potentially promote more ethical consumer conduct and mitigate environmentally harmful responses, nurturing a more sustainable environment.

Second, most of the reviewed articles (87%) have been based on correlations between *measured* attachment styles and consumer responses (e.g., Bagozzi & Verbeke, 2020; Japutra et al., 2018; Pozharliev et al., 2021; Sarkar et al., 2023), thereby precluding explicit claims of causality. By contrast, we investigated the cause–effect relationship between attachment styles and consumers' ethically oriented responses by *manipulating* attachment patterns and the impact of such manipulations on consumers' subsequent responses, which is surprisingly scarce in the extant literature.

Third, unlike most of the reviewed articles (67%), which have not documented any mediators between consumer attachment and key customer outcomes, we identify a mediating pathway (virtue signaling) through which attachment styles influence consumers' green purchase behavior and their more generic prosocial responses. Our psychological mechanism of virtue signaling adds depth to our understanding of how attachment styles shape ethical consumption responses (Albert & Horowitz, 2009). This distinctive feature of our work sheds further light on the moral aspects in the relationship between attachment anxiety and apparent acts of altruism.

Fourth, rather than treating virtue signaling as a uni-dimensional construct (Ok et al., 2021), we build on and extend recent conceptualizations that have distinguished between self-oriented and other-oriented virtue signaling (Wallace et al., 2020). Specifically, we provide new insights by demonstrating that anxiously attached individuals engage in green purchase behavior and other prosocial actions primarily for self-oriented virtue-signaling purposes to achieve intrinsic benefits but not necessarily for other-oriented reasons linked to highlighting their moral grandstanding to others. In sum, beyond the practical and societal relevance of our examined topic, we contribute theoretically by linking consumers' attachment styles with prosocial responses in the marketplace through a nuanced virtue-signaling account. Our approach of using samples from a rarely researched region of the world and demonstrating replicability of our main mechanism across diverse settings and study paradigms means that the current work provides converging evidence for our proposed chain of events.

**Table 1** Systematic literature overview of studies examining the effect of consumers' attachment style on their consumption responses

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
1	Sarkar et al. (2023)	Consumers of beauty salon brands	India	225	Measured	N/A	No	When consumers perceive a match between a beauty salon brand and their own interpersonal acceptance, it leads to increased brand happiness, which correlates with narcissistic brand love. Additionally, the impact of brand-interpersonal acceptance goal congruence on brand happiness is positively influenced by the anxious attachment style and negatively affected by cynicism
2	Pipoli de Azambuja et al. (2023)	Young Customers	Peru	524	Measured	N/A	No	Customer happiness drives both abstract and concrete loyalty. It is a holistic assessment derived from expectations versus experiences, defining one's happiness. Cultivating loyal customer relationships emerges as a path to enhancing overall happiness. Anxious attachment diminishes customer happiness, while secure attachment increases it

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
3	Sidhu et al. (2023)	Consumers	Malaysia	153	Measured	N/A	No	Consumers with high attachment anxiety are more likely to repurchase products or services but are less likely to engage in positive word-of-mouth after a satisfying recovery experience. Attachment avoidance does not impact consumers' behavioral intentions. When anxiety and avoidance interact, they positively influence word-of-mouth intentions following satisfaction with recovery efforts, although this interaction does not affect repurchase intentions
4	Frydman and Tena (2023)	Members of an online panel	Israel	1024	Measured	Customer Commitment; Customer Trust	No	There are mediation effects between attachment styles and long-term relationship indicators such as intention to stay and cooperation. Trust and commitment act as mediators, highlighting the importance of psychological structures in establishing and maintaining long-term relationships

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
5	Davis et al. (2023)	Undergraduates	Studies 1A-B and Study 2=United States Study 3=Korea	Study 1A=350 Study 1B=284 Study 2=206, Study 3=160	Measured and Manipulated	N/A	No	Consumer attachment styles impact responses to romantic advertising, with anxiously attached consumers showing more positive attitudes toward romantic-themed ads compared to securely attached individuals
6	Gasiorowska et al. (2022)	Online participants (Prolific)	Study 1: N/A Study 2: United States	Study 1=1397 Study 2=657	Measured	Materialistic Values	No	Individuals with an anxious attachment style are more inclined to buy status-signaling products compared to those with a secure attachment style. This relationship is mediated by materialism
7	Rippé et al. (2022)	Online participants (Qualtrics)	United States and India	610	Measured	Emotional Loneliness	No	Psychosocial elements, notably negative ones, shape self-gifting motivations. Insecure attachment and emotional loneliness emerged as precursors to self-gifting behaviors. Indian consumers show higher self-gifting motivations compared to their U.S. counterparts. Gender is not a significant factor in explaining self-gifting motivations in the U.S., but it does play a role in India

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
8	Namrata and Parmar (2021)	Students	Indian	484	Measured	N/A	No	Celebrity expertise and trustworthiness are positively associated with consumer brand attachment, while celebrity attractiveness does not contribute to building brand attachment. Attachment anxiety and avoidance, respectively, play a moderating role in the relationship between celebrity endorser traits and brand attachment
9	Pozharliev et al. (2021)	Online participants (MTurk)	N/A	Study 1 = 350 Study 2 = 279 Study 3 = 225	Manipulated	N/A	No	Customers with low scores on the anxious attachment style (AAS) react more unfavorably to frontline service robots when compared to interactions with frontline human agents. This suggests that for customers with low AAS, replacing a human service agent with a service robot can have a negative impact on their attitudes and behaviors toward the service

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
10	David et al. (2020)	Study 1 = Online participants (MTurk) Study 2 = Students	United States	Study 1 = 325 Study 2 = 205	Measured	N/A	No	There are seven common measures of attachment styles that differ in terms of length and how well they represent different types of relationships
11	Verbeke et al. (2020)	Online participants	The Netherlands	798	Measured	Relationship Dimensions (Trust, Satisfaction, Commitment)	No	Higher levels of relationship-specific anxiety and avoidance, particularly avoidance, negatively impact customers' willingness to recommend the firm. Relationship-specific attachment styles prove to be more effective in explaining customers' willingness to recommend than general attachment styles. Attachment anxiety and avoidance also negatively affect the dimensions of trust in, satisfaction with, and commitment to the firm. The negative effects are particularly strong for attachment avoidance and have a notable impact on trust and commitment



Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
12	Bagozzi and Verbeke (2020)	Salespeople	The Netherlands	334	Measured	N/A	No	Employee motivation and job satisfaction are influenced by a combination of genetic factors and coping styles when dealing with role conflict. The secure attachment style plays a significant role in moderating the impact of one of the variants of a gene on motivation, depending on the level of perceived role conflict
13	Norberg et al. (2020)	Students and other participants	Australia	Students = 86 Others = 94	Measured	Interpersonal Problems	No	Individuals with hoarding issues show higher anxious attachment and interpersonal challenges, but not higher loneliness. Anxious attachment correlates with increased discarding problems through interpersonal difficulties

**Table 1** (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
14	Jung and Park (2020)	People having relationship contact experiences with service companies	South Korea	199	Measured	N/A	No	Individuals with an anxious attachment style are more dependent, while those with an avoidant attachment style lean toward independence. These attachment styles impact customers' satisfaction with their relationships. Personal contact methods like telephone communication are viewed more positively than impersonal methods like group email in terms of relationship satisfaction. Frequent contact has a positive effect on the satisfaction of anxious and avoidant customers with service providers

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
15	Kordrostami and Kordrostami (2019)	Online participants (Mturk)	United States	Study 1 = 200 Study 2 = 132 Study 3 = 146	Manipulated	N/A	No	Individuals with a promotion focus exhibit fewer negative reactions (such as revenge and brand avoidance) and more positive responses (trust and loyalty) to a brand failure compared to those with a prevention focus. Additionally, there is an interaction between consumers' attachment style and regulatory focus. The influence of regulatory focus is observed mainly among secure consumers, while fearful consumers' behavior remains largely unchanged regardless of regulatory focus

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
16	Kim et al. (2019)	Employees	Republic of Korea	328	Measured	N/A	No	Employee personalities, including openness, conscientiousness, extraversion, and neuroticism, impact job flow experience, which subsequently influences organizational commitment and consumer-oriented behavior positively. Attachment anxiety moderates the relationships between these personality traits and job flow experience, while attachment avoidance moderates the relationships of four out of five personality traits with job flow experience

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
17	Sreejesh et al. (2017)	Customers	India	510	Measured	N/A	No	Organizational Citizenship Behavior (OCB) predicts brand love by influencing satisfaction as a mediator. An individual's attachment style plays a moderating role: those with an anxious attachment style enhance the relationship between "other customer perception" and satisfaction, while those with an avoidant attachment style weaken the same relationship

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
18	Japutra et al. (2018)	Customers	United Kingdom	432	Measured	N/A	No	Brand attachment and attachment styles (anxious and avoidant) are separate concepts. Brand attachment influences both positive behaviors (like brand loyalty) and negative behaviors (such as trash-talking, schadenfreude, and anti-brand actions). Only the avoidant attachment style affects the relationships between brand attachment and these consumer responses. For individuals with high attachment avoidance, the connection between brand attachment and brand loyalty weakens. Conversely, the links between brand attachment and negative behaviors like trash-talking, schadenfreude, and anti-brand actions become stronger

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
19	David and Bearden (2017)	Study 1 = Undergraduates, Study 2 = Adults	United States	Study 1 = 180 Study 2 = 127	Measured	N/A	No	The effectiveness of ads featuring interpersonal relationships is linked to consumers' attachment styles. Highly anxious individuals are less likely to buy products from such ads, while those with less anxious and more secure attachment styles are more inclined to make a purchase. The perception of how well the advertised product fits with oneself plays a crucial role in mediating the connection between attachment styles and the likelihood of purchasing products depicted in such ads
20	Sarkar and Sarkar (2017)	Studies 1–3 = University students	India	Study 1 = 9 Study 2 = 76 Study 3 = 381	Measured	N/A	No	Certain product categories and social consumption situations can lead to feelings of embarrassment. Anxiously attached individuals are more susceptible to experiencing embarrassment in such situations compared to individuals with secure or avoidant attachment styles

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
21	Bidmon (2017)	Adolescents/high school pupils	Germany	216	Measured	N/A	No	The dependent-independent dimension of parental attachment styles has a positive influence on the corresponding dimension of brand attachment. This influence applies to all constructs within the chain of brand attachment, including brand trust and brand loyalty. However, this pattern does not hold for the secure-anxious dimension of parental attachment styles. Instead, the secure-anxious dimension of brand attachment has a significant impact, at least for brand trust
22	Vieira and Monteiro (2016)	Studies 1–2 = Bank customers	Brazil	Study 1 = 162 Study 2 = 131	Measured	N/A	No	The interaction between anxious and avoidant attachment styles is negatively associated with switching intention. Furthermore, this interaction weakens the main effect of marketing variables on both repurchase intention and switching intention



Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
23	Whelan and Dawar (2016)	Undergraduates	Canada	123	Manipulated	Attributions of Controllability; Attributions of Stability	No	Individuals primed with the secure attachment style and the fearful attachment style tend to assign the least amount of blame to the brand. These effects are driven by distinct mechanisms. The secure attachment style reduces attributions of controllability, while the fearful attachment style reduces attributions of stability
24	Beldona and Kher (2015)	Consumers	United States	307	Measured	Customer Sacrifice	No	Attachment avoidance has a stronger influence on perceived hospitality compared to attachment anxiety. Customer perceptions of sacrifice play a dual role by directly affecting perceived hospitality and mediating the effects of attachment styles on perceived hospitality

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
25	Mende and van Doorn (2015)	Clients	United States	Time period 1 = 451, Time period 2 = 115	Measured	Coproduction, Objective Financial Well-Being	No	Consumers actively participate in financial counseling services to improve their credit scores and reduce financial stress. Higher involvement can compensate for lower financial literacy and mitigate the adverse effects of attachment avoidance on coproduction
26	Mende et al. (2013)	Insurance customers	North America	1199	Measured	Preference for Closeness	No	Attachment styles are better predictors of closeness preferences compared to established marketing variables. Attachment styles and closeness preferences have an impact on loyalty intentions and behavior, even when accounting for established factors like relationship quality. Closeness preferences partially mediate the influence of attachment styles on cross-buying behavior

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
27	Vlachos et al. (2010)	Customers	Greece	Study 1 = 215 Study 2 = 465	Measured	N/A	No	Consumer-retailer love levels are positively influenced by factors such as retail store image, perceived transactional value, and corporate social responsibility (CSR) associations. However, for individuals who place lower value on warm relationships with others and those with an avoidant attachment style, the impact of consumer-retailer love on re-patronage intentions is less pronounced. Highly avoidant individuals show a negative effect of consumer-retailer love on re-patronage intentions

Table 1 (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
28	Thomson et al. (2012)	Online respondents	United states	Study 1 = 428 Study 2 = 481	Measured	Loss of Self-Image, Loss of Benefits	No	Attachment styles play a role in how consumers react when brand relationships come to an end. Particularly, individuals classified as “fearful,” characterized by high attachment anxiety and avoidance, are more prone to behaviors such as complaining to third parties, fixating on causing harm to the brand, and seeking retribution against brands. Two factors mediate this effect: threats to consumers’ self-image and the loss of benefits from their relationship with the brand
29	Mende and Bolton (2011)	Insurance customers	North America	1 199	Measured	N/A	No	Customers with secure attachment styles tend to be more satisfied, trusting, and emotionally committed to the service firm and its employees. Depending on their attachment style, customers either form stronger bonds with the firm (abstract attachment target) or with an employee (concrete attachment target)

**Table 1** (continued)

Article No	Authors, Year	Sample Type	Sample Nationality	Sample Size <sup>a</sup>	Attachment: Measured or Manipulated	Mediation for Attachment-Outcome Link <sup>b</sup>	Ethical Findings and Implications	Main Results
30	Albert and Horowitz (2009)	Study 1 = Employees, Study 2 = Undergraduates, Study 3 = Managers	Study 1 and 3 = India, Study 2 = United states	Study 1 = 207, Study 2 = 223, Study 3 = 227	Measured	N/A	Yes	The ethical standards of consumers and managers with different attachment styles (secure, preoccupied, fearful, or dismissing) are examined. Among male consumers, those with dismissing attachment styles show the highest indifference to ethical transgressions, while secure individuals express the strongest ethical beliefs
31	The Current Research	Studies 1–3 = Mixed student/community	Pakistan	Study 1 = 419, Study 2 = 260, Study 3 = 213	Measured and Manipulated	Virtue Signaling (Self-Oriented)	Yes	Attachment anxiety (vs. avoidance) positively predicts (a) green purchase behavior, and (b) prosocial behavior. These links are mediated by virtue signaling, in general, and by self-oriented virtue signaling, in particular. Further, they apply even when attachment patterns are manipulated rather than measured

The literature originates from a Scopus title/abstract/keyword search on peer-reviewed journal articles published in English (as of September 4, 2023). The following search string was used: “attachment style\*” AND (consumer\* OR customer\* OR shopper\* OR marketer\*), yielding a total of 82 articles that were screened for suitability. Articles based on quantitative empirical evidence with a focus on consumer responses as a function of attachment style were selected for inclusion, resulting in a final sample of 30 articles (plus the current research)

<sup>a</sup>Denotes final sample sizes used in the analyses for customer outcomes in the main studies, excluding pretests and pilot studies

<sup>b</sup>Denotes studies in which the link between consumers’ attachment styles and a dependent variable is mediated by another variable

## Attachment Styles, Green Purchase Behavior, and Prosocial Responses

Attachment theory was originally developed by Bowlby (1969/1982), who highlighted that the social tie between a child and primary caregivers influences the child's relationships with others in the future, even adolescent and adult romantic relationships (Hazan & Shaver, 2017) and virtues related to considerations of others (Mikulincer & Shaver, 2007). Indeed, past research has contended that individuals' levels of attachment (in-) security can affect their mental representations of others, in turn influencing their responses of prosocial virtues such as compassion, generosity, empathy, and altruism (Mikulincer & Shaver, 2015).

Scholars suggest two underlying dimensions (anxiety and avoidance) of attachment styles (Bartholomew & Horowitz, 1991; Brennan et al., 1998). Attachment avoidance is a sign of worries about dependency, disclosure, and closeness to others, sometimes resulting in people with an avoidant attachment style to abstain from interpersonal relationships altogether or exaggerating their qualities to appear independent and self-sufficient (Rippé et al., 2019). On the contrary, attachment anxiety reflects a fear of abandonment and rejection (Thomson et al., 2012). In other words, someone who is anxiously attached worries that their significant other will not be there for them when they really need or want, often leading to an overly strong desire for acceptance and a fear of rejection and abandonment (Mende & Bolton, 2011). Individuals with high rejection sensitivity also tend to be more anxiously attached in close relationships, exacerbating their desire for social acceptability (Sato et al., 2020).

The literature suggests that attachment anxiety and avoidance have distinct connections with moral considerations. Attachment anxiety predicts higher moral concern for damage, injustice, and impurity, whereas attachment avoidance predicts lower moral concern for harm and unfairness (Koleva et al., 2014). Anxiously attached people tend to be driven by a desire for approval, frequently engage in acceptance-seeking behaviors, and sometimes show more prosocial tendencies than their counterparts with an avoidant attachment style (Game & Crawshaw, 2017; for a review, see Mikulincer & Shaver, 2005). When motivated by a desire to be viewed favorably, this may result in deeds of kindness, cooperation, or philanthropy (Eisenberg, 2006). In addition, research shows that anxiously attached individuals perceive the emotional costs of helping as lower than individuals with an avoidant attachment style, leading to more prosocial behavior among the former (Richman et al., 2015).

Several studies indicate that people with an avoidant attachment pattern are less likely to help, collaborate, and volunteer in various acts of altruism (Shaver et al., 2016). By contrast, anxiously attached individuals have been shown to be particularly prone to behave prosocially to be

accepted, liked, and approved (Ein-Dor et al., 2011), at times by engaging in 'compulsive caregiving' (Gross et al., 2017; Shaver et al., 2019). Further, people with an avoidant attachment style, on average, express less empathetic concern and a lower willingness to take responsibility for others' welfare (Bailey et al., 2012; Kogut & Kogut, 2013), whereas people with an anxious attachment style often exhibit compulsive prosocial tendencies (Ein-Dor and Tal, 2012; Monin et al., 2010).

Anxiously attached individuals frequently develop attachment toward material objects and consumption practices that signal social status (Kogut & Kogut, 2011; Sun et al., 2020), likely as a compensatory buffer for their interpersonal insecurities. Thus, anxiously attached consumers often use status-signaling consumption as a substitute for romantic relationships (Gasirowska et al., 2022; Norris et al., 2012). Given that green purchase behavior and other acts of altruism can signal social status (Griskevicius et al., 2010; Luomala et al., 2020), and considering that green consumption has a clear communal connotation focusing on relational aspects (Otterbring, 2023; Yan et al., 2021), we hypothesize

**Hypothesis 1** Attachment anxiety (vs. avoidance) is positively related to (a) green purchase behavior, and (b) prosocial behavior.

### The Mediating Role of Virtue Signaling

Recent investigations have underscored the importance of social sharing as a catalyst for fostering persistent commitment to moral behavior (Wen & Hu, 2023). Koleva et al. (2014) explored the link between attachment styles and various dimensions of moral judgments and concerns to gain a deeper understanding of moral cognition, finding that higher attachment avoidance was linked to weaker ethical concern for harm and unfairness, whereas higher attachment anxiety was linked to stronger moral concern for harm, unfairness, and impurity. Accordingly, attachment anxiety may lead to elevated concern regarding harm, which could be explained by heightened empathetic worries, compulsive caregiving, and potentially more prosocial behaviors (Mikulincer et al., 2001). Conversely, attachment avoidance is rather linked to lower empathy, compassion, and prosociality (Mikulincer & Shaver, 2007).

We propose that virtue signaling should mediate the link between attachment anxiety (vs. avoidance) and consumers' green purchase behavior and their prosocial responses beyond consumption. Indeed, anxiously attached people are thought to be driven by social concerns and sometimes suppress selfishness to boost group cohesion (Ein-Dor & Tal, 2012; Koleva et al., 2014). This could lead to an increased inclination to engage in virtue signaling. On the contrary, as attachment avoidance is linked to lower levels of prosocial

responses, consumers with an avoidant attachment style should display weaker virtue-signaling tendencies because their attachment style is linked to lower compassion, empathy, and gratitude, even in environments that naturally promote prosociality (Kogut & Kogut, 2013; Mikulincer & Shaver, 2010). Conspicuous green purchase behavior is well-aligned with the virtue-signaling construct. For example, Konuk and Otterbring (2024) reported that virtue signaling was positively associated with consumers' purchase intentions and willingness to pay for organic foods. Therefore, we hypothesize

**Hypothesis 2** Attachment anxiety (vs. avoidance) is positively related to virtue signaling.

**Hypothesis 3** Virtue signaling mediates the link between attachment anxiety (vs. avoidance) and (a) green purchase behavior, and (b) prosocial behavior.

### Self-Oriented Versus Other-Oriented Virtue Signaling

Individuals frequently behave in ways that center on their self-perceptions to preserve a consistent and unified sense of the self (Gecas, 1982; Sirgy, 1982). However, virtue signaling often serves other-oriented purposes, with people seeking to obtain rewards from outside sources, which may cause disparities between intrinsic benefits and other-oriented privileges when engaging in public displays of one's seemingly superior moral character (Wallace et al., 2020).

Wallace et al. (2020) differentiated between self-oriented virtue signaling—performed to feel good and gain self-respect—and other-oriented virtue signaling—primarily performed to impress others. In both forms of virtue signaling, the conduct is deliberately displayed in public and designed to convey one's admirable moral character (Grace & Griffin, 2009; Wallace et al., 2020). Wallace et al. (2020) found that self-esteem was enhanced by self-oriented virtue signaling, whereas other-oriented virtue signaling was unassociated or even negatively associated with self-esteem across studies. Moreover, while individuals' donation intentions were positively associated with self-oriented virtue signaling, such intentions were negatively associated with other-oriented virtue signaling. These findings suggest that self-oriented more than other-oriented virtue signaling may be linked to prosocial behavior.

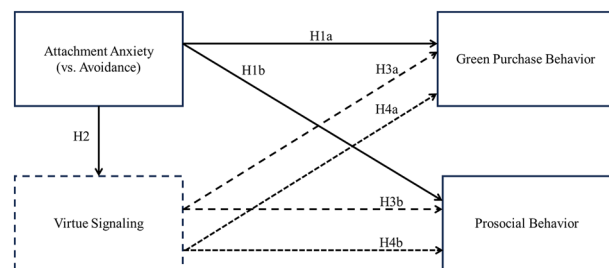
We posit that anxiously attached consumers should be more motivated to act in ways that are seen as morally righteous to satisfy their own need for self-validation and assurance. Indeed, people with an anxious attachment style are more inclined to reward themselves and engage in self-gifting to cope with interpersonal disappointments (Rippé et al., 2019). Further, leaders with greater attachment anxiety

are more likely to exhibit self-centered leadership motives, whereas leaders with greater attachment avoidance are less prone to display prosocial motives to lead (Davidovitz, et al., 2007). Research has also demonstrated that anxiously attached individuals have lower self-esteem (Bartholomew & Horowitz, 1991; Dan et al., 2014). Drawing on these findings, it seems plausible that anxiously attached consumers might use prosocial behavior and green consumption not only for benevolent motives but also to deal with their fear of rejection, gain self-respect, and feel good about themselves. As such, consumers with an anxious attachment style should reasonably be more motivated to engage in self-oriented rather than other-oriented virtue signaling, given that self-oriented virtue signaling might temporarily aid in increasing their self-esteem and sooth their interpersonal insecurities. Therefore, as depicted in our conceptual model (see Fig. 1), we predict

**Hypothesis 4** Self-oriented, not other-oriented, virtue signaling mediates the link between attachment anxiety (vs. avoidance) and (a) green purchase behavior, and (b) prosocial behavior.

### Study 1: Measured Attachment Anxiety (vs. Avoidance)

In Study 1, we sought to examine whether measured attachment anxiety, but not measured attachment avoidance, would be linked to green purchase behavior (H1a), prosocial behavior (H1b), and virtue signaling (H2), with the link between attachment anxiety and (a) green purchase behavior, and (b) prosocial behavior mediated by virtue signaling (H3a–b). To this end, we recruited a mixed student/community sample (cf. Griskevicius et al., 2012) of 419 participants (50% female) from Pakistan. Most participants aged 21–35 years (55%), followed by 18–20 years (42%), with the



**Fig. 1** Conceptual Model. *Note:* Solid lines represent direct relationships between predictor and focal outcomes (H1a–b) or mediator (H2), whereas dashed lines represent the indirect effects between predictor and focal outcomes through the mediating role of virtue signaling (H3a–b). Squared dots represent the indirect effects between predictor and focal outcomes through self-oriented, not other-oriented, virtue signaling (H4a–b)



remaining minority (3%) aged 36–65 years. Our sample size yields a statistical power greater than 95% to detect an effect size corresponding to  $d=0.40$  (or  $r=0.20$ ), assuming the conventional alpha level of  $\alpha=0.05$ . Given that this effect size is even smaller than the typical effect sizes in psychology and consumer research (e.g., Eisend, 2015; Funder & Ozer, 2019; Gignac & Szodorai, 2016; Krefeld-Schwalb & Scheibehenne, 2023), the study is highly powered to test our focal hypotheses. To further boost statistical power, we relied on one-tailed tests in this and all subsequent studies whenever we have a one-sided prediction (Jones, 1954; Otterbring et al., 2021; Rice & Gaines, 1994). Indeed, it is generally recommended to use one-tailed tests for hypotheses that specify a certain direction (Cho & Abe, 2013; Saunders, 1993).

Participants filled out a series of well-validated scales measuring attachment anxiety and attachment avoidance, virtue signaling, prosocial behavior, and green purchase behavior. Further, to increase the internal validity of the study and because green purchase behavior and prosocial responses are typically perceived as socially desirable (Folwarczny et al., 2023), we measured social desirability using 16 binary “yes” or “no” questions (e.g., “I always admit my mistakes openly and face the potential negative consequences.”). These questions were based on the inventory recently developed by Larson (2019). We created a sum score reflecting the number of socially desirable responses participants made. We used this variable as a covariate in our mediation models to isolate the effect of attachment anxiety on our central outcomes.

We took several steps to address problems associated with common method bias, as this bias source can inflate correlations between variables. Specifically, we varied common scale properties between 5-point scales, 7-point scales, and binary response formats, as minimizing common scale properties constitutes an effective way of mitigating common method variance (Krosnick, 2018; Podsakoff et al., 2012). Moreover, to avoid potential priming effects, our focal constructs were not measured immediately after one another. For instance, we included some filler items for the purpose of a different project, while also including the social desirability scale between the green purchase behavior items and the prosocial behavior items.

To measure attachment style, we used the Experiences in Close Relationships (ECR) scale in its short form (Wei et al., 2007). This scale captures the anxious and avoidant attachment dimensions through 6 items each (1 = strongly disagree; 7 = strongly agree). An example item for the anxious dimension is, “I often worry about being abandoned.” Similarly, an example from the avoidant dimension is, “I try to avoid getting too close to my partner.” A factor analysis verified the assumed factor structure by using direct oblimin as the rotation method due to the expected factor correlations.

Two distinct factors emerged with eigenvalues greater than one corresponding to the two attachment dimensions. These factors jointly explained 50.06% of the variance in attachment styles (36.98% for the anxious dimension and 13.08% for the avoidant dimension), had no cross-loadings of 0.4 or greater, and were averaged into two composite index variables of anxious ( $\alpha=0.81$ ) and avoidant ( $\alpha=0.77$ ) attachment, respectively.

We used all six items from Ok et al. (2021) to measure virtue signaling, originally developed by Aquino and Reed (2002). Participants received their respective statements (e.g., “I often buy products that communicate the fact that I have these characteristics”: 1 = strongly disagree; 7 = strongly agree) after having been instructed to indicate the extent to which a series of morality-related traits (e.g., fair, honest) are characteristic of their symbolic actions in public. Participants’ responses were averaged into a composite virtue signaling index ( $\alpha=0.82$ ).

We measured prosocial behavior with the four-item scale developed by Baumsteiger and Siegel (2019), in which participants are asked to indicate the extent to which they are willing to exhibit a series of prosocial behaviors, including “Assist a stranger with a small task (e.g., help them carry groceries, watch their things while they use the restroom),” with ratings made on a 5-point scale (1 = definitely would not do this; 5 = definitely would do this). Like the other measures, participants’ replies were averaged into a composite prosocial behavior index ( $\alpha=0.79$ ).

Finally, we measured green purchase behavior through the five items proposed by Kim and Choi (2005), with sample items such as, “When I have a choice between two equal products, I purchase the one less harmful to other people and the environment.” Participants provided their answers using a seven-point Likert format (1 = strongly disagree; 7 = strongly agree), and the responses were averaged into a composite index of green purchase behavior ( $\alpha=0.81$ ).

## Results and Discussion

### Main Analyses, Stage 1: Bivariate Correlations

We performed bivariate correlation analyses to test **H1a–b** and **H2**. In support of **H1a–b**, there were statistically significant correlations between attachment anxiety and (a) green purchase behavior ( $r=0.16$ ,  $p<0.001$ ) and (b) prosocial behavior ( $r=0.10$ ,  $p=0.021$ ), whereas the links between these constructs and attachment avoidance were substantially weaker and inconsistent (green purchase behavior:  $r=0.10$ ,  $p=0.044$ ; prosocial behavior:  $r=-0.01$ ,  $p=0.906$ ). Further, in line with **H2**, virtue signaling was significantly associated with attachment anxiety ( $r=0.21$ ,  $p<0.001$ ) but not with attachment avoidance ( $r=0.09$ ,  $p=0.065$ ).



Interestingly, social desirability correlated negatively with both attachment dimensions (anxious:  $r = -0.15$ ,  $p = 0.002$ ; avoidant:  $r = -0.19$ ,  $p < 0.001$ ) but positively with virtue signaling ( $r = 0.17$ ,  $p < 0.001$ ), green purchase behavior ( $r = 0.24$ ,  $p < 0.001$ ), and prosocial behavior ( $r = 0.20$ ,  $p < 0.001$ ). Therefore, to ascertain that social desirability did not constitute a crucial confound, we supplemented the above analyses with partial correlations, in which we controlled for social desirability. The nature and significance of our findings remained unchanged.

### Main Analyses, Stage 2: Testing for Mediation

To test **H3a–b**, we conducted two mediation analyses (PROCESS Model 4; Hayes, 2017) on each focal outcome (green purchase behavior and prosocial behavior, respectively). In these analyses, attachment anxiety was the predictor, virtue signaling was the mediator, and green purchase behavior or prosocial behavior acted as the outcome variable. To show the unique predictive validity of attachment anxiety in shaping our findings, we (1) added attachment avoidance and social desirability as covariates, and (2) ran similar analyses with attachment avoidance replaced as our predictor and with attachment anxiety as a covariate. However, our results remain unchanged if attachment avoidance and social desirability are dropped as covariates.

Across analyses, a bootstrap procedure that generated a sample size of 5000 revealed that the indirect effect of attachment anxiety on green purchase behavior and prosocial behavior through virtue signaling was consistently statistically significant. Indeed, the 95% confidence intervals (CIs) did not contain zero in any of these cases, thereby demonstrating that mediation was at play (indirect effects, green purchase behavior: 95% CI [0.05, 0.15]; prosocial behavior: 95% CI [0.01, 0.06]). Thus, in support of **H3a–b**, the effect of attachment anxiety on (a) green purchase behavior, and (b) prosocial behavior was mediated by virtue signaling, even after accounting for the alternative avoidant attachment dimension and social desirability. Comparable mediation analyses with attachment avoidance as the predictor and attachment anxiety as the covariate yielded no such indirect effects (green purchase behavior: 95% CI [−0.05, 0.06]; prosocial behavior: 95% CI [−0.01, 0.02]). Moreover, the variance inflation factors (VIFs) in this study and all subsequent ones consistently ranged only between 1 and 2, well below the standard cutoff values of 5 (Hair et al., 1998) or 10 (Neter et al., 1983). As such, multicollinearity is unlikely a threat to the interpretation of our results.

In sum, these findings attest to the unique explanatory power of the anxious attachment dimension in forecasting consumers' green purchase behavior and their more general prosocial tendencies, with virtue signaling emerging as a psychological mechanism underlying these results. However,

a limitation of Study 1 is the correlational nature of the findings, thereby precluding explicit claims of causality. To address this concern, provide more substantive evidence for our theorizing, and strengthen the practical implications of our research, Study 2 sought to manipulate rather than measure attachment anxiety (vs. avoidance) to demonstrate the causal nature of our proposed chain of events.

### Study 2: Manipulated Attachment Anxiety (vs. Avoidance)

Although attachment styles are usually perceived as relatively stable (Mikulincer & Shaver, 2007), people have multiple attachment schemas (Baldwin & Meunier, 1999). These schemas may activate specific attachment patterns, even if they do not match a person's stable attachment style (Bartz & Lydon, 2004). Therefore, exposing participants to information resembling a given attachment style can trigger certain cognitive schemas that are congruent with this style, which can subsequently exert downstream effects on consumer responses (Davis et al., 2023; Kogut & Kogut, 2011; Swaminathan et al., 2009). In Study 2, we manipulated participants' attachment anxiety (vs. avoidance) and tested whether induced anxious (vs. avoidant) attachment would increase green purchase behavior (**H1a**), prosocial behavior (**H1b**), and virtue signaling (**H2**), with the effect of attachment condition on (a) green purchase behavior, and (b) prosocial behavior mediated by virtue signaling (**H3a–b**).

Study 2 included a mixed student/community sample of 260 participants (34% female;  $M_{\text{age}} = 23$  years). This sample size has a statistical power of approximately 90% to detect a small-to-moderate effect size corresponding to  $d = 0.40$  (or  $r = 0.20$ ), assuming the conventional alpha level of  $\alpha = 0.05$ . As such, Study 2 constitutes yet another high-powered investigation.

Participants were assigned to the anxious or avoidant attachment conditions in a between-subjects design. Following previous research on manipulated attachment patterns (Baldwin et al., 1996; Kogut & Kogut, 2013; Mikulincer et al., 2001), participants in the attachment anxiety condition were asked to recall a close relationship in which they felt that the other person was reluctant to get as close as they would have liked themselves and, as a result, worried that the other person was not really in love or did not want to stay, and that their desire to get closer to that person sometimes scared him/her away. Participants in the attachment avoidance condition were instead asked to recall a close relationship in which they felt uncomfortable being close to the other person, found it difficult to trust and depend on him/her, and felt nervous when the other person came too close. Subsequently, participants across conditions were asked to think further about the person they recalled and the

corresponding relationship in terms of when it took place, how long it lasted, and which type of relationship they were thinking of (e.g., romantic, friendship, family).

Next, participants replied to items measuring virtue signaling ( $\alpha=0.84$ ), prosocial behavior ( $\alpha=0.76$ ), and green purchase behavior ( $\alpha=0.83$ ) using the same items and response formats as in Study 1. Further, to increase the internal validity of the study, participants replied to the 4-item Brief Social Desirability Scale (BSDS; Haghghat, 2007), which contains binary “yes” or “no” questions such as “Do you always practice what you preach to people?” We created a sum score of these items, with our measure reflecting the number of socially desirable responses participants made.

Finally, participants provided demographic information and, as a manipulation check of attachment anxiety, indicated their agreement on two statements from the anxious dimension of the State Adult Attachment Scale (Gillath et al., 2009): “I feel a strong need to be unconditionally loved right now” and “I really need to feel loved right now” (1 = strongly disagree; 7 = strongly agree;  $r=0.64$ ).

## Results and Discussion

### Manipulation Check

An independent samples *t* test on the manipulation check index revealed that participants in the anxious attachment condition ( $M=4.89$ ,  $SD=1.70$ ) scored significantly higher in attachment anxiety than those in the avoidant attachment condition ( $M=4.35$ ,  $SD=1.63$ ;  $t(258)=2.61$ ,  $p=0.005$ ,  $d=0.33$ ). Thus, the manipulation was successful.

### Main Analyses, Stage 1: Differences in Group Means and Bivariate Correlations

We conducted a series of independent sample *t* tests and bivariate correlations to examine the validity of **H1a–b** and **H2**. First, participants in the anxious attachment condition ( $M=4.59$ ,  $SD=1.40$ ) did not differ significantly in green purchase behavior from their counterparts in the avoidant attachment condition ( $M=4.47$ ,  $SD=1.34$ ;  $t(258)=0.69$ ,  $p=0.246$ ,  $d=0.09$ ). However, there was a significant correlation between participants’ scores on the manipulation check index measuring attachment anxiety and their green purchase behavior ( $r=0.40$ ,  $p<0.001$ ). Taken together, these findings provide mixed support for **H1a**.

Second, participants in the anxious attachment condition ( $M=3.82$ ,  $SD=0.93$ ) did not differ in prosocial behavior compared to those in the avoidant attachment condition ( $M=3.73$ ,  $SD=0.87$ ;  $t(258)=0.75$ ,  $p=0.227$ ,  $d=0.09$ ). Still, there was a significant correlation between participants’ scores on the manipulation check index measuring

attachment anxiety and their prosocial behavior ( $r=0.45$ ,  $p<0.001$ ), thus yielding mixed support for **H1b**.

Third, participants in the anxious attachment condition ( $M=4.87$ ,  $SD=1.37$ ) scored significantly higher in virtue signaling than their peers in the avoidant attachment condition ( $M=4.49$ ,  $SD=1.28$ ;  $t(258)=2.27$ ,  $p=0.012$ ,  $d=0.29$ ). Moreover, there was a significant correlation between participants’ scores on the manipulation check index measuring attachment anxiety and their virtue signaling ( $r=0.42$ ,  $p<0.001$ ), providing strong support for **H2**.<sup>1</sup>

However, participants’ social desirability scores might have confounded these results, considering that social desirability was positively associated with virtue signaling ( $r=0.12$ ,  $p=0.028$ ) and green purchase behavior ( $r=0.14$ ,  $p=0.014$ ), although not with prosocial behavior ( $r=0.02$ ,  $p=0.382$ ). Therefore, following the procedure of Study 1, we supplemented the above analyses with partial correlations, in which we controlled for social desirability. Importantly, the nature and significance of our results did not change.

### Main Analyses, Stage 2: Testing for Mediation

To test **H3a–b**, we conducted two mediation analyses (PROCESS Model 4; Hayes, 2017) on each of our focal outcomes (green purchase behavior and prosocial behavior). In these analyses, attachment condition (anxious = 1; avoidant = 0) was the predictor, virtue signaling was the mediator, and green purchase behavior or prosocial behavior acted as the outcome variable. We added social desirability as a covariate to show the unique predictive validity of attachment anxiety in shaping our findings. Still, the exclusion of social desirability does not change the nature or significance of our results.

Across analyses, a bootstrap procedure that generated a sample size of 5000 revealed that the indirect effect of attachment condition on green purchase behavior and prosocial behavior through virtue signaling was consistently significant. Indeed, the 95% CIs did not contain zero, thereby demonstrating that mediation was at play (indirect effects, green purchase behavior: 95% CI [0.04, 0.36]; prosocial behavior: 95% CI [0.02, 0.27]). Replacing the group factor (anxious vs. avoidant) with participants’ score on the

<sup>1</sup> Excluding 16 outliers, who scored more than 2.24 standard deviations beyond the means on our focal outcomes—in the top and bottom 2.5% of the distribution (Aguinis et al., 2013)—did not change our results pertaining to **H1a** and **H2** (green purchase behavior:  $t(242)=0.93$ ,  $p=.178$ ,  $d=0.12$ ; virtue signaling:  $t(242)=3.15$ ,  $p<.001$ ,  $d=0.41$ ), although participants in the anxious (vs. avoidant) attachment condition reported significantly higher scores on the prosocial behavior index, thus providing additional support for **H1b** ( $t(242)=1.80$ ,  $p=.037$ ,  $d=0.23$ ;  $M_{\text{anxious}}=3.99$ ,  $SD=0.67$  vs.  $M_{\text{avoidant}}=3.83$ ,  $SD=0.74$ ).

manipulation check index measuring attachment anxiety, as some scholars do (Ejelöv & Luke, 2020; Söderlund, 2016), again yielded significant indirect effects across both focal outcomes (green purchase behavior: 95% CI [0.07, 0.20]; prosocial behavior: 95% CI [0.05, 0.15]). Thus, in support of **H3a–b**, the effect of attachment anxiety (vs. avoidance) on (a) green purchase behavior, and (b) prosocial behavior was mediated by virtue signaling, even after accounting for social desirability.

### Study 3: Self-Oriented Virtue Signaling Mediates the Focal Attachment Effects

Study 3 served two main purposes. First, we sought to test our more nuanced virtue-signaling account by distinguishing between participants' self-oriented and other-oriented virtue signaling. According to our conceptualization, anxiously attached individuals should be particularly prone to engage in green purchase behavior and other prosocial actions primarily for self-oriented rather than other-oriented reasons. Therefore, we tested the premise that our former mediation should only occur through the self-oriented dimension of the virtue-signaling construct, but not for the other-oriented dimension (**H4a–b**).

Second, a critic might argue that our attachment results should only emerge in public contexts when there are others around who can observe a given person's virtue-signaling attempts, green purchase behavior, and prosocial actions (cf. Swaminathan et al., 2009). Although our previous studies did not clearly specify across all items whether the context in our research was public or private, we assumed that most participants interpreted the setting as public. After all, individuals have little to gain by engaging in virtue signaling in the complete absence of others and most established definitions of virtue signaling even assume that a given target behavior is visible, performed publicly, observed by others, and at least partially performed to enhance others' perceptions of one's own moral character (Ok et al., 2021; Wallace et al., 2020). Nevertheless, to provide more compelling evidence for the primary context in which our results should emerge, we explicitly stated to study participants that they should assume a public setting when replying to the survey items linked to our focal constructs.

Study 3 included a mixed student/community sample of 213 participants (37% female;  $M_{\text{age}} = 23$  years). This sample size has a statistical power greater than 80% to detect a small-to-moderate effect size corresponding to  $d = 0.40$  (or  $r = 0.20$ ), assuming the conventional alpha level of  $\alpha = 0.05$ .

Participants replied to the same items used in Study 1 to measure attachment styles ( $\alpha_{\text{anxious}} = 0.82$ ;  $\alpha_{\text{avoidant}} = 0.80$ ) and provided their responses on the same measures for green purchase behavior ( $\alpha = 0.79$ ) and prosocial behavior

( $\alpha = 0.67$ ) used previously. Unlike Studies 1–2, however, it was emphasized that participants should reply to the items as they would do in public settings. Further, we added cues to such public settings as part of the items themselves. For example, the green purchase behavior item, "When I have a choice between two equal products, I purchase the one less harmful to other people and the environment" was modified to "When I have a choice between two equal products *in public* [not italicized to participants], I purchase the one less harmful to other people and the environment."

To add depth to our virtue-signaling conceptualization, participants replied to a series of items using a 7-point scale (1 = strongly disagree; 7 = strongly agree) adapted from Grace and Griffin (2009) and Wallace et al. (2020). These items were tailored to the current context and developed to distinguish between self-oriented and other-oriented virtue signaling. Specifically, to capture self-oriented virtue signaling, participants replied to the following items: "If I mention something that signals my moral character, I feel like I have made a difference"; "It increases my self-respect when I mention something that signals my moral character"; "Mentioning something that signals my moral character makes me feel good"; and "I like to remind myself of the moral values I support through mentioning them." Similarly, to capture other-oriented virtue signaling, they provided their responses on these items: "I like to mention my sympathy in certain moral issues because I get to show something about my support"; "I like to mention something that signals my moral character so that people know I am a good person"; "I like to mention something that signals my moral character because it makes me look good"; and "I mention certain things that signal my moral character because doing so makes me look cool." The items were averaged to create two index variables reflecting self-oriented ( $\alpha = 0.79$ ) and other-oriented ( $\alpha = 0.84$ ) virtue signaling.

## Results and Discussion

### Main Analyses, Stage 1: Bivariate Correlations

We performed bivariate correlation analyses to test **H1a–b** and **H2**. In support of **H1a–b**, there were statistically significant correlations between attachment anxiety and both green purchase behavior ( $r = 0.24$ ,  $p < 0.001$ ) and prosocial behavior ( $r = 0.13$ ,  $p = 0.027$ ). Unlike Study 1, these links also emerged for attachment avoidance (green purchase behavior:  $r = 0.21$ ,  $p = 0.002$ ; prosocial behavior:  $r = 0.15$ ,  $p = 0.029$ ). Further, consistent with **H2**, both virtue-signaling dimensions were significantly associated with attachment anxiety (self-oriented:  $r = 0.18$ ,  $p = 0.005$ ; other-oriented:  $r = 0.21$ ,  $p = 0.001$ ) but not with attachment avoidance (self-oriented:  $r = 0.07$ ,  $p = 0.298$ ; other-oriented:  $r = 0.12$ ,  $p = 0.073$ ).

**Table 2** Overview of the extent to which a given hypothesis received empirical support

Hypothesis	Study 1	Study 2	Study 3	Internal Meta-Analysis
H1a: Attachment anxiety (vs. avoidance) is positively related to green purchase behavior	Supported	Partially Supported	Supported	Supported
H1b: Attachment anxiety (vs. avoidance) is positively related to prosocial behavior	Supported	Partially Supported	Supported	Supported
H2: Attachment anxiety (vs. avoidance) is positively related to virtue signaling	Supported	Supported	Supported Overall	Supported
H3a: The link between attachment anxiety (vs. avoidance) and green purchase behavior is mediated by virtue signaling	Supported	Supported	Supported Overall	N/A
H3b: The link between attachment anxiety (vs. avoidance) and prosocial behavior is mediated by virtue signaling	Supported	Supported	Supported Overall	N/A
H4a: The link between attachment anxiety (vs. avoidance) and green purchase behavior is mediated by self-oriented, not other-oriented, virtue signaling	N/A	N/A	Supported	N/A
H4b: The link between attachment anxiety (vs. avoidance) and prosocial behavior is mediated by self-oriented, not other-oriented, virtue signaling	N/A	N/A	Supported	N/A

### Main Analyses, Stage 2: Testing for Mediation

To test **H4a–b**, we conducted two mediation analyses (PROCESS Model 4; Hayes, 2017) on each focal outcome (green purchase behavior and prosocial behavior). In these analyses, attachment anxiety was the predictor, the two virtue-signaling dimensions (self-oriented and other-oriented) served as parallel mediators, and green purchase behavior or prosocial behavior acted as the outcome variable. We (1) added attachment avoidance as a covariate, and (2) ran similar analyses with attachment avoidance replaced as our predictor and with attachment anxiety as a covariate. However, our results remain unchanged if attachment avoidance is dropped as a covariate.

Across analyses, a bootstrap procedure that generated a sample size of 5000 revealed that the indirect effect of attachment anxiety on green purchase behavior and prosocial behavior through self-oriented virtue signaling was consistently significant. Indeed, the 95% CIs did not contain zero in any of these cases, thereby demonstrating that mediation was at play (indirect effects, green purchase behavior: 95% CI [0.001, 0.16]; prosocial behavior: 95% CI [0.003, 0.12]). However, similar results did not emerge with other-oriented virtue signaling as a mediator (indirect effects, green purchase behavior: 95% CI [−0.002, 0.09]; prosocial behavior: 95% CI [−0.003, 0.05]). Thus, in support of **H4a–b**, the effect of attachment anxiety on (a) green purchase behavior, and (b) prosocial behavior was mediated by self-oriented but not by other-oriented virtue signaling, even after accounting for the alternative avoidant attachment dimension.

Combining all virtue signaling items into a composite index ( $\alpha = 0.87$ ) without differentiating between the self-oriented and other-oriented facets of this construct (as in Studies 1–2) yielded significant overall indirect

effects between attachment anxiety and both key outcomes through virtue signaling (indirect effects, green purchase behavior: 95% CI [0.02, 0.20]; prosocial behavior: 95% CI [0.01, 0.14]). Comparable mediation analyses with attachment avoidance as the predictor and attachment anxiety as the covariate yielded no such indirect effects, as the 95% CIs consistently crossed zero. All in all, these findings attest to the uniqueness of the self-oriented virtue-signaling dimension as the primary mechanism driving participants' green purchase behavior and prosocial responses<sup>2</sup>.

### Main Analyses, Stage 3: Internal Meta-Analysis

We performed an internal meta-analysis (Goh et al., 2016; Otterbring et al., 2023) for the links between attachment anxiety and consumers' (1) green purchase behavior, (2) prosocial behavior, and (3) virtue signaling across Studies 1–3. In these analyses, we averaged the self-oriented and other-oriented virtue-signaling scores from Study 3, but the nature and significance of all findings remain unchanged if we analyze each of these facets separately. Using the Stouffer test (Gidlöf et al., 2021; Rosenthal, 1995), we found a significant effect of attachment anxiety on (1) green purchase behavior ( $Z = 4.34, p < 0.001$ ), (2) prosocial behavior ( $Z = 2.72, p = 0.003$ ), and (3) virtue signaling ( $Z = 5.69, p < 0.001$ ), thus supporting **H1a–b** and **H2** at the general level (see Table 2).

<sup>2</sup> It should be noted, however, that the indirect effects for self-oriented virtue signaling were consistently in the “Goldilocks Zone” (Götz et al., 2021), suggesting that the strongest evidence for mediation occurs when virtue signaling is treated as a unidimensional construct.



## General Discussion

### Results Summary and Theoretical Contributions

This research examined the mediating role of virtue signaling in the link between attachment styles and consumers' prosocial responses within and beyond the consumption domain. We performed three studies in which we both measured (Studies 1 and 3) and manipulated (Study 2) consumers' attachment patterns to test a series of novel hypotheses. Our findings provide significant theoretical contributions.

First, we find that consumers with an anxious attachment style are more prone than those with an avoidant attachment style to exhibit prosociality, not only by purchasing and preferring green products (e.g., switching products for ecological reasons) but also in terms of their more general prosocial tendencies (e.g., comfort someone after they experience a hardship).

Second, whereas prior research has typically neglected virtue signaling in shaping consumer responses with a prosocial connotation, we find convergent evidence that the link between consumers' attachment styles and such responses operates indirectly through virtue signaling, in general, and through self-oriented (but not other-oriented) virtue signaling, in particular. In other words, we find that anxiously attached consumers are more inclined to engage in virtue signaling than their counterparts with avoidant attachment patterns, primarily to attain personal benefits. This explains why anxiously attached consumers are more motivated to engage in green purchase behavior and exhibit other prosocial actions.

Third, our approach to manipulate rather than measure attachment patterns implies that we can make causal inferences between attachment styles and several focal variables with a strong ethical connotation (i.e., virtue signaling, green purchase behavior, and prosocial behavior). This is relatively rare in the attachment literature on consumer responses (as evidenced from Table 1), which has mainly been restricted to correlational evidence from cross-sectional survey data wherein consumers' attachment patterns have solely been measured rather than manipulated. As such, our empirical evidence provides researchers and managers with more compelling evidence for the causal role of consumers' attachment patterns in shaping their ethically oriented responses. Relatedly, our findings emerged even when the theoretically relevant confounding factor of social desirability had been controlled for in our analyses, implying that our focal effects are robust. As our study package combines rigor, control, and high internal validity with external validity, these results should have considerable generality.

Fourth, as stressed in the introduction of this article, whereas most former related studies have been exclusively based on WEIRD samples, typically in the form of European or North American university students or Western online panel members (e.g., MTurk, Prolific, CrowdFlower), we complement such scholarly work by reporting three studies from a non-WEIRD part of the world (i.e., Pakistan). Doing so helps to mitigate the prevalent WEIRD bias in the published literature, as called for by many researchers in marketing, consumer research, and business ethics (Ares et al., 2024; Elbæk et al., 2023; Mirowska et al., 2021). Accordingly, combining our results with prior research should make the existing literature less prone to over-generalization (Saad, 2021; Yarkoni, 2022).

### Managerial Implications

The findings reported herein provide producers and marketers of green and sustainable products with novel insights. Specifically, our results should be helpful to managers who want to improve their understanding of how consumers' attachment styles (anxious or avoidant) affect prosocial behaviors and green purchasing patterns, especially when virtue signaling is involved, which tends to be the case in public consumption contexts. From a practical perspective, our work leverages several important implications.

First, the current results suggest that anxiously attached consumers might be an essential market for companies promoting sustainable products. Therefore, advertising campaigns should focus on these consumers to elicit their altruism and motivate them to purchase sustainable products. This can be swiftly done by ethically using verbal and pictorial content resembling the core information provided in our own attachment manipulations (e.g., fear appeals with text and images highlighting relationship rejection, loneliness, and abandonment as well as romantic refusal or unrequited love), as momentarily increasing consumers' attachment anxiety seems to promote more prosocial purchase preferences and other altruistic actions. Importantly, our findings are not restricted to consumers' stable attachment styles but also generalize to situation-specific manipulations of their attachment schemas. Thus, even consumers who usually have an avoidant attachment style should be more prone to prefer or purchase sustainable goods if such products are promoted and positioned in a way that mirrors common ways to induce attachment anxiety.

An alternative approach to provide a sense of security among anxiously attached consumers could be to incorporate role models who are portrayed as dependable, kind, truthful, and moral across communication formats (e.g., in-store displays, ads, and commercials), as doing so might also support sustainable consumption and other prosocial

responses (Folwarczny & Otterbring, 2021; Mikulincer & Shaver, 2007). Additionally, our virtue-signaling findings indicate that ad themes can potentially convey the idea that green purchase behavior is both favored and endorsed by others but simultaneously brings personal benefits such as happiness, pride, and self-esteem (Puska et al., 2018; Wallace et al., 2020), considering that anxiously attached individuals often struggle with low self-esteem and a more pessimistic self-view (Bartholomew & Horowitz, 1991; Dan et al., 2014).

Second, in marketing communication strategies, sustainable consumption should be presented as a signal of virtue and as a part of ethical consumption. This should motivate anxiously attached consumers to engage in prosocial behavior and purchase products that both benefit themselves and the planet. Product packaging may also be used to signal the ethical features of a given product. For instance, it would be beneficial to present clear information about the product's ethical and environmental standards (Rokka & Uusitalo, 2008) to attract the attention of anxiously attached consumers and enable them to signal virtue through their purchases and instigate ethical engagement.

Third, brands might consider implementing cause-related marketing campaigns such as donations to charities (Strahilevitz, 1999; Wallace et al., 2020) to attract the attention of anxiously attached consumers. Thus, businesses can strategically expand their market position for eco-friendly products by concentrating on and developing a deep understanding of consumers who either have a stable anxious attachment style or are momentarily induced to be more anxiously attached. Companies and practitioners can improve their tactics and better cater to environmentally sensitive consumer segments by understanding the mechanism of virtue signaling, which seems to drive more sustainable purchase behaviors based on ethical and moral values, especially those related to self-oriented virtue signaling linked to personal benefits.

## Limitations and Future Research

This research is not without limitations. First, we did not inquire about participants' pre-existing knowledge and level of interest in green consumption. Consequently, despite the high internal validity characterizing our research and our inclusion of theoretically relevant control variables, there might still be further unmeasured confounding factors. Future research should consider including data on participants' prior knowledge and interest in green products to address this aspect, thereby mitigating the impact of additional confounds.

Second, our assessment of green purchase behavior encompasses a broad propensity for purchasing green products, lacking specificity concerning distinct product

categories. Although our measures of green purchase behavior are widely used (Kim & Choi, 2005), we readily admit that we did not focus on a specific sustainable product or category. It is worth noting that certain factors might exert a differential effect on consumers' purchase behavior, depending on the specific product category in question (Liobikienė & Bernatoniene, 2017). Similarly, the four actions used to measure prosocial behavior, while forming a well-validated scale (Baumsteiger & Siegel, 2019), undoubtedly do not capture all possible responses linked to prosociality that a given individual might engage in. Therefore, future studies should preferably include a broader set of prosociality measures and specific aspects linked to green products, encompassing characteristics like biodegradability, recycled/minimized packaging, and low energy consumption.

Third, our study designs, in which we consistently measured rather than manipulated our mechanism of virtue signaling, can be perceived as a potential methodological drawback, which can be addressed in studies that rely on the causal-chain approach. In this approach, the mediator is experimentally induced rather than subjectively stated (i.e., measured) by participants (Pieters, 2017; Pirlott & MacKinnon, 2016; Spencer et al., 2005). We also note that there are other ways to measure virtue signaling (e.g., Bai et al., 2023). Therefore, and despite the rarity of capturing virtue signaling empirically (Grubbs et al., 2019; Kraft-Todd et al., 2023), future studies should test the generalizability of our virtue-signaling findings across further measurement approaches.

Fourth, the data in the current research were collected from non-WEIRD samples in a developing country within a collectivist culture. Although this should be perceived as a strength, given the over-reliance on WEIRD samples in the literature, it remains to be examined whether our results generalize to other cultural contexts. Hence, future studies should optimally include participants with more diverse demographic, psychographic, and ethnic characteristics, including data from other developing non-WEIRD societies, countries, and cultures.

Fifth, a significant portion of the participants across studies fell below the age of 35. Young consumers exhibit distinct characteristics compared to older adults (Kanchanapibul et al., 2014). For instance, adolescents and younger consumers are susceptible to green purchase appeals (Bulut et al., 2021) and digital food marketing (Ares et al., 2022). Therefore, the findings in this article may not necessarily generalize to older consumer segments. However, the nature and significance of all our focal effects remained significant after controlling for participants' age. Nevertheless, future researchers could consider including participants from a broader range of ages to investigate green purchase variations across age-specific segments or generational cohorts. Additionally, qualitative studies may offer deeper insights into the role of virtue signaling

and attachment styles in shaping consumers' green purchase behavior and moral decision-making.

Finally, although our findings clearly apply to public contexts, it remains to be examined whether differences in the extent to which the setting is described as public (vs. private) might moderate our results, particularly considering that prior research has found such a moderating influence in related settings (e.g., Besharat et al., 2024; Griskevicius et al., 2010). While we anticipate that our findings, at least in part, should be contingent on public places, as the visibility and observability of various symbolic demonstrations that signal one's moral character constitute cornerstones in most established virtue-signaling operationalizations (e.g., Ok et al., 2021; Wallace et al., 2020), further research is needed to verify the context (as public or private) as a theoretically relevant moderator.

**Acknowledgements** The authors would like to extend their profound gratitude to all those who helped in the data collection process. They sincerely appreciate the time, effort, and cooperation from the following individuals: Dr. Faisal Shehzad (University of Management and Technology, Lahore), Dr. Mussadiq Ali Khan (Iqra University, Islamabad; Lahore Garrison University, Lahore), Dr. Shoaib Ali (Air University, Islamabad), Dr. Qazi Muhammad Naveed (University of South Asia, Lahore; Bahria University, Islamabad), Dr. Maria Sultana (Leads University, Lahore; Shifa Tameer-e-Millat University, Islamabad), Dr. Awais Ahmed (University of Central Punjab, Lahore), Dr. Awais Ilyas (University of Lahore, Lahore), Dr. Yasir Mehmood and Dr. Kamran Iqbal (University of Lahore, Sargodha), Dr. Shahid Rasool and Mr. Muhammad Zubair Tariq (University of Sargodha, Sargodha), Mr. Muhammad Mateen Yaqoob (COMSATS University Islamabad, Abbottabad), Mr. Sanaullah (University of Malakand, Chakdara Dir (Lower)), Mr. Muhammad Asif (University College of Veterinary and Animal Sciences, Narowal), Mr. Ifraaz Adeel (University of Home Economics, Lahore) Miss. Arooj Fatima Mazhar (Riphah International University, Islamabad), Mr. Abdul Rahman Hasni (Government Post-graduate College, Khanpur), and Mr. Muhammad Mujahid Shahid Hasni (Quaid-i-Azam University, Islamabad). The authors also thank people from the following organizations: Mr. Muhammad Hassan (Mart and Mart), and Mr. Muhammad Awais (Mobify, Funsol Technologies, and Bitech).

**Author Contributions** MJSJH contributed toward conceptualization, investigation, data curation, writing—original draft, and writing—review & editing. AK contributed toward conceptualization, writing—original draft, and writing—review & editing. TO contributed toward conceptualization, methodology, formal analysis, writing—original draft, writing—review & editing, project administration, and Supervision.

**Funding** Open access funding provided by University of Agder.

**Data availability** The data that support the findings of this article will be available from the corresponding author upon reasonable request.

## Declarations

**Conflict of interest** The authors have no conflicts of interest to disclose.

**Informed Consent** All participants provided informed consent before taking part in this research.

**Research Involving Human Participants** The studies reported in this article complied with the principles expressed in the Declaration of Helsinki and the national ethical regulations for research involving human subjects.

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