



Understanding the Intersections of Stress and the Marketplace to Improve Consumer Well-Being

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Many consumers experience high levels of stress, which has been shown to have adverse effects on their physical and mental well-being. Previous consumer research has started to shed light on the significance of stress for consumer research. However, despite its importance, only a few top-level marketing papers to date have addressed how stress impacts consumer decision-making and vice versa. To address this gap in the literature, we develop a multidisciplinary framework that characterizes what causes stress, which function the stress response serves, and the impact of stress on the mind and body, as well as how these different levels of analysis can be captured. We apply this framework to identify the intersections of stress and the marketplace, contextualize extant research, and formulate new questions for future consumer research. Our review highlights that stress may arise due to uncertainty, lack of control, and negative social interactions and through direct neurobiological pathways during the customer journey. In turn, stress affects consumers' needs, preferences, and cognitive capacities. We discuss how consumers may better adapt to stress, how to better cater to the needs of consumers experiencing stress, and what marketers can do to minimize stress along the customer journey.

Keywords: Stress; Mental Wellbeing; Customer Journey; Body; Brain; Physiology

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CONSUMER RELEVANCE AND CONTRIBUTION STATEMENT

For more than a decade, Americans have been experiencing unhealthy levels of stress, reaching extreme levels for roughly a quarter of the population. However, stress is relevant for consumer research not only because of the mere number of consumers experiencing stress, but also because the customer journey has a complex bidirectional relationship with consumers' stress levels. We develop a novel, multidisciplinary conceptual framework of stress in consumer research and apply this framework to better understand this bidirectional relationship.

Whereas pioneering work in consumer research has investigated the relationship between stress and behavior on the behavioral and psychological levels, we complement this with recent insights from biological and neuroscientific investigations of stress. This is important because understanding how the stress response is implemented on the neurobiological level can help researchers make better predictions of likely antecedents and consequences of consumers' stress responses.

Our review indicates that consumers experiencing stress should be considered a vulnerable group, and that consumers need to be aware of the impact of stress on their decision quality. This applies specifically to the direct biological causes and effects of stress; these are not necessarily perceived to be stressful but can still influence consumer behavior. Marketing to consumers experiencing stress therefore requires conscious and ethical business practices. Additionally, from a profitability perspective, it might be important for companies to integrate stress better into their

marketing activities. This is because due to the dynamic nature of stress effects on consumer behavior, marketing strategies that promise revenue in the short term (e.g., selling fast food to stressed consumers) can backfire later (e.g., because consumers do not enjoy their meals and share negative word of mouth online). Taken together, this review has important implications for both consumers and marketers and calls for future research to better understand stress in the marketplace.

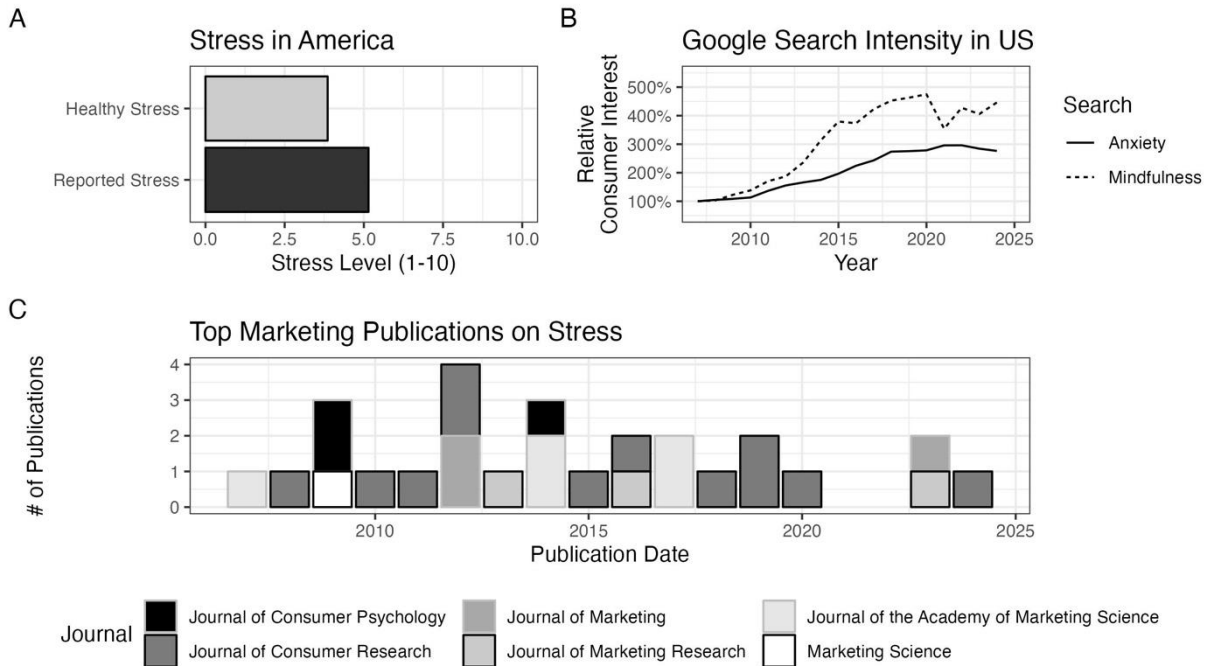
STRESS IS TOO IMPORTANT TO BE NEGLECTED IN CONSUMER RESEARCH

Mental well-being is of the highest importance for the functioning of our societies, our economies, and each individual. However, medical and psychological experts warn that current Western lifestyles are linked to increasing levels of stress and lead to serious mental health problems (Horton 2007; Moss 2019). For more than a decade, the average American consumer has been experiencing unhealthy levels of stress (see figure 1, panel A), and in 2023, almost a quarter of Americans were experiencing extreme levels of stress (American Psychological Association 2023). Stress is caused by a variety of issues, including demanding work environments conflicting with caregiver roles, economic uncertainty, and daily hassles such as a restaurant not accepting credit cards. Beyond stressful events in consumers' everyday lives, national or global crises—such as climate change (Reser and Swim 2011) and pandemics (Al Omari et al. 2020; Hwang et al. 2020; Qian and Jiang 2022; de Quervain et al. 2020; Shanahan et al. 2022)—also contribute to increased stress levels.

Long-term stress has been linked to depression (Hammen 2005; Hammen et al. 2009), a leading cause of diminished capacity to work (Kessler 2012). Similarly, chronic stress is associated with other negative health outcomes such as cardiovascular diseases (Steptoe and Kivimäki 2012) and obesity (Siervo, Wells and Cizza 2009; Tomiyama 2019), as well as with increased substance abuse including alcohol (Brady and Sonne 1999; Frone 1999), smoking (Pomerleau and Pomerleau 1991), and opioids (MacLean, Armstrong and Sofuoglu 2019).

FIGURE 1

STRESS: CONSUMER INTEREST AND ACADEMIC PUBLICATIONS



Note: Panel A shows average data of self-reported stress levels as well as judgments of healthy stress levels of U.S. consumers between 2007 and 2023 in the Stress in America survey conducted by the American Psychological Association. Average stress levels are continuously judged as unhealthy. Panel B shows relative consumer interest by Google search intensity of U.S. consumers since 2007 (relative to the intensity in 2007) for “anxiety” and “mindfulness.” Search intensity has doubled and quintupled, respectively. Panel C shows the number of publications in top-level marketing journals since 2007 (indexed in EBSCOhost) on the subject of “stress.” The average number is stagnating at around 1.6 per year across six top-level marketing journals. Details on the literature search and full list of publications are provided in Appendix A and Table 1.

In the past years, the public discourse has increasingly included our threatened mental health (Insel 2023; Moss 2021). This development is reflected, for example, in an increasing consumer interest in the topic as captured by Google searches for common symptoms such as “anxiety” or potential stress remedies such “mindfulness” (see figure 1, panel B). In line with this, there is a quickly growing market for products offering stress measurements (e.g., Fitbit, Apple watch) or stress remedies (e.g., e-mental health apps, Cannabidiol oil).

Given its high prevalence and societal impact, stress needs to be acknowledged and integrated in marketing theory, as was pointed out over 15 years ago (Mathur, Moschis and Lee 2006; Moschis 2007). However, the number of academic publications on stress in top marketing journals has been stagnating at around 1.6 publications per year across six top-level marketing journals (see figure 1, panel C, and Table 1).

The aim of the current review is to overcome conceptual and methodological roadblocks that limit progress in consumer stress research. To this end, we first develop an interdisciplinary conceptualization of stress, then build a comprehensive model of the intersections of stress and the marketplace, and then derive directions for future research. We conclude the paper with implications for both consumers and marketing managers.

TABLE 1**TOP MARKETING PUBLICATIONS ON STRESS SINCE 2007**

Full reference	Brief Summary	Level(s) of Analysis	Direction of Influence
Moschis, George P. (2007), “Stress and Consumer Behavior,” <i>Journal of the Academy of Marketing Science</i> , 35(3), 430–44.	A conceptual framework of stress and consumer behavior that focuses on how hassles and hurdles during the customer journey may cause stress and how consumption may reflect a strategy to cope with stress.	Functional, Psychological	Stress ↔ Consumer Behavior
Miller, Elizabeth Gelfand, Barbara E. Kahn, and Mary Frances Luce (2008), “Consumer Wait Management Strategies for Negative Service Events: A Coping Approach,” <i>Journal of Consumer Research</i> , 34(5), 635–48.	Experimental study of the effectiveness of different wait management strategies (shortening the wait, providing duration information) in service environments on consumer stress levels.	Functional, Psychological	Consumer Behavior → Stress
Duhachek, Adam and Katie Kelting (2009), “Coping Repertoire: Integrating a New Conceptualization of Coping with Transactional Theory,” <i>Journal of Consumer Psychology</i> , 19(3), 473–85.	Experimental study of individual differences in how many coping strategies consumers have available to cope with stress.	Psychological	Consumer Behavior → Stress

Patrick, Vanessa M., Matthew P. Lancellotti, and Gustavo Demello (2009), "Coping with Non-Purchase: Managing the Stress of Inaction Regret," <i>Journal of Consumer Psychology</i> , 19(3), 463–72.	Experimental study of how different appraisals lead to more or less psychological stress after a forgone purchase, and subsequently different coping styles. Specifically, if a forgone purchase is judged as goal-relevant this leads to high stress, active coping, and higher purchase likelihood given the next opportunity.	Functional, Psychological	Stress ↔ Consumer Behavior
Chen, Rachel R., Eitan Gerstner, and Yinghui Yang (2009), "Should Captive Sardines Be Compensated? Serving Customers in a Confined Zone," <i>Marketing Science</i> , 28(3), 599–608.	Mathematical model and analysis of optimal compensation and pricing strategies for overcrowded service environments.	Functional	Stress → Consumer Behavior
Wood, Stacy (2010), "The Comfort Food Fallacy: Avoiding Old Favorites in Times of Change," <i>Journal of Consumer Research</i> , 36(6), 950–63.	Experimental study showing that life changes facilitate changes of consumption patterns.	Functional, Psychological	Stress → Consumer Behavior
St. James, Yannik, Jay M. Handelman, and Shirley F. Taylor (2011), "Magical Thinking and Consumer Coping," <i>Journal of Consumer Research</i> , 38(4), 632–49.	Qualitative study on how magical thinking may serve as a consumer coping strategy with stress.	Functional, Psychological	Consumer Behavior → Stress
Meng Zhang and Xiuping Li (2012), "From Physical Weight to Psychological Significance: The Contribution of Semantic Activations," <i>Journal of Consumer Research</i> , 38(6), 1063–75.	Experimental study of how experiences that are semantically related to "weight" can activate the experience of other semantically related experiences in a different domain.	Psychological	Consumer Behavior → Stress

Zablah, Alex R., George R. Franke, Tom J. Brown, and Darrell E. Bartholomew (2012), "How and When Does Customer Orientation Influence Frontline Employee Job Outcomes? A Meta-Analytic Evaluation," <i>Journal of Marketing</i> , 76(3), 21–40.	Meta-analytic study of how customer orientation affects perceived role conflict, role ambiguity, and job outcomes of sales employees.	Functional	/
Chan, Kimmy Wa and Echo Wen Wan (2012), "How Can Stressed Employees Deliver Better Customer Service? The Underlying Self-Regulation Depletion Mechanism," <i>Journal of Marketing</i> , 76(1), 119–37.	Experimental study of how work stress causes fatigue in service employees which, in turn, reduces their performance in tasks that require self-control.	Functional, Psychological	/
Thomas, Manoj and Claire I. Tsai (2012), "Psychological Distance and Subjective Experience: How Distancing Reduces the Feeling of Difficulty," <i>Journal of Consumer Research</i> , 39(2), 324–40.	Experimental study showing that different context and mindset manipulations semantically related to "distance" alter perceptions of task difficulty.	Psychological	Consumer Behavior → Stress
Maeng, Ahreum, Robin J. Tanner, and Dilip Soman (2013), "Conservative When Crowded: Social Crowding and Consumer Choice," <i>Journal of Marketing Research</i> , 50(6), 739–52.	Experimental study showing that perceived crowdedness increases consumers' preference for safety and risk aversion.	Functional	Stress → Consumer Behavior
Mai, Robert and Stefan Hoffmann (2014), "Accents in Business Communication: An Integrative Model and Propositions for Future Research," <i>Journal of Consumer Psychology</i> , 24(1), 137–58.	Conceptual framework of how language accents affect business communication. Accents may activate stereotypes and negative associations that influence downstream behavior.	Functional, Psychological	/

Johnson, Jeff and Ravipreet Sohi (2014), “The Curvilinear and Conditional Effects of Product Line Breadth on Salesperson Performance, Role Stress, and Job Satisfaction,” <i>Journal of the Academy of Marketing Science</i> , 42(1), 71–89.	Empirical study of the influence of the number of product lines handled by a salesperson on their role ambiguity and conflict, task overload, and job performance. The research identifies a curvilinear relationship with benefits of a medium number of product lines compared too few or many product lines.	Functional	/
Ruvio, Ayalla, Eli Somer, and Aric Rindfleisch (2014), “When Bad Gets Worse: The Amplifying Effect of Materialism on Traumatic Stress and Maladaptive Consumption,” <i>Journal of the Academy of Marketing Science</i> , 42(1), 90–101.	Empirical study finding that, in the face of mortal threat, materialism is a vulnerability factor for the experience of traumatic stress and maladaptive consumption.	Functional, Psychological	Stress ↔ Consumer Behavior
Woermann, Niklas and Joonas Rokka (2015), “Timeflow: How Consumption Practices Shape Consumers’ Temporal Experiences,” <i>Journal of Consumer Research</i> , 41(6), 1486–1508.	Qualitative study on how the nature of different consumption practices induces experiences of time flow. Misalignment of such practices may result in stress.	Psychological	Consumer Behavior → Stress
Garvey, Aaron M., Frank Germann, and Lisa E. Bolton (2016), “Performance Brand Placebos: How Brands Improve Performance and Consumers Take the Credit,” <i>Journal of Consumer Research</i> , 42(6), 931–51.	Experimental study showing that products branded as performance-enhancing positively affect performance via a placebo effect. Consumers feel less anxious under pressure and attribute the performance gains to themselves.	Psychological	Consumer Behavior → Stress
Durante, Kristina M. and Juliano Laran (2016), “The Effect of Stress on Consumer Saving and Spending,” <i>Journal of Marketing Research</i> , 53(5), 814–28.	Experimental study of the effect of stress on consumer saving and spending. Stressed consumers tend to keep their resources together and focus their spending on perceived necessities.	Functional, Psychological, Neurobiological	Stress → Consumer Behavior

<p>Miao, C. and Guangping Wang (2017), “Effects of Work-Family Interface Conflicts on Salesperson Behaviors: A Double-Edged Sword,” <i>Journal of the Academy of Marketing Science</i>, 45(5), 762–83.</p>	<p>Empirical study of how collegial interactions and individual job commitment attenuate the relationship between work-family conflicts and job performance.</p>	<p>Functional, Psychological</p>	<p>/</p>
<p>Albrecht, Carmen-Maria, Stefan Hattula, and Donald Lehmann (2017), “The Relationship between Consumer Shopping Stress and Purchase Abandonment in Task-Oriented and Recreation-Oriented Consumers,” <i>Journal of the Academy of Marketing Science</i>, 45(5), 720–40.</p>	<p>Empirical study of the influence of shopping stress and purchase abandonment across consumers that are either shopping with the goal of completing a task or for recreation. Recreation-oriented consumers are less likely to abandon a shopping trip in the face of stress.</p>	<p>Functional, Psychological</p>	<p>Stress → Consumer Behavior</p>
<p>Netemeyer, Richard G., Dee Warmath, Daniel Fernandes, and John G. Lynch Jr. (2018), “How Am I Doing? Perceived Financial Well-Being, Its Potential Antecedents, and Its Relation to Overall Well-Being,” <i>Journal of Consumer Research</i>, 45(1), 68–89.</p>	<p>Empirical study of the role of financial decision-making in consumer mental well-being. The study finds that, for example, late payments or lack of long-term financial planning resulted in money management stress</p>	<p>Functional</p>	<p>Consumer Behavior → Stress</p>
<p>Biswas, Dipayan, Courtney Szocs, and Annika Abell (2019), “Extending the Boundaries of Sensory Marketing and Examining the Sixth Sensory System: Effects of Vestibular Sensations for Sitting versus Standing Postures on Food Taste Perception,” <i>Journal of Consumer Research</i>, 46(4), 708–24.</p>	<p>Experimental study showing that the vestibular sensation of standing induces physical stress and, thereby, reduces decreases sensory sensitivity. This reduces the enjoyment of food.</p>	<p>Psychological, Neurobiological</p>	<p>Stress → Consumer Behavior</p>

Kim, Jeehye Christine, Monica Wadhwa, and Amitava Chattopadhyay (2019), “When Busy Is Less Indulging: Impact of Busy Mindset on Self-Control Behaviors,” <i>Journal of Consumer Research</i> , 45(5), 933–52.	Experimental study showing that consumers who feel busy also feel more important and, therefore, exert more self-control. The study rules out stress as an alternative explanation.	Psychological	Stress → Consumer Behavior
Melumad, Shiri and Michel Tuan Pham (2020), “The Smartphone as a Pacifying Technology,” <i>Journal of Consumer Research</i> , 47(2), 237–55.	Experimental study showing that stressed consumers engage with their smartphone because it serves as an adult “pacifier”.	Functional, Psychological	Stress ↔ Consumer Behavior
Salisbury, Linda Court, Gergana Y. Nenkov, Simon J. Blanchard, Ronald Paul Hill, Alexander L. Brown, and Kelly D. Martin (2023), “Beyond Income: Dynamic Consumer Financial Vulnerability,” <i>Journal of Marketing</i> , 87(5), 657–78.	Conceptual framework that distinguishes financial vulnerability from low socioeconomic status by defining it as the finance-related risk for future harm (including stress and negative affect).	Functional, Psychological	Consumer Behavior → Stress
Moorhouse, Michael, Miranda Goode, June Cotte, and Jennifer Widney (2023), “Helping Those That Hide: Anticipated Stigmatization Drives Concealment and a Destructive Cycle of Debt,” <i>Journal of Marketing Research</i> , 60(6), 1135–53.	Experimental study showing that consumers with debts who anticipate stigmatization engage in behaviors that aim to conceal their debt. These behaviors, in turn, hinder debt reduction and reduce wellbeing.	Functional, Psychological	Stress ↔ Consumer Behavior
Belli, Alex, François A Carrillat, Natalina Zlatevska, and Elizabeth Cowley (2024), “How Does Time Pressure Influence Risk Preferences? Answers from a Meta-Analysis”, <i>Journal of Consumer Research</i> , 50(6), 1172–97.	Meta-analytic study of the effect of time pressure on risk preferences. Results show substantial heterogeneity across studies that can be explained by differences in the nature of time pressure as well as the perception of negative outcomes.	Functional	Stress → Consumer Behavior

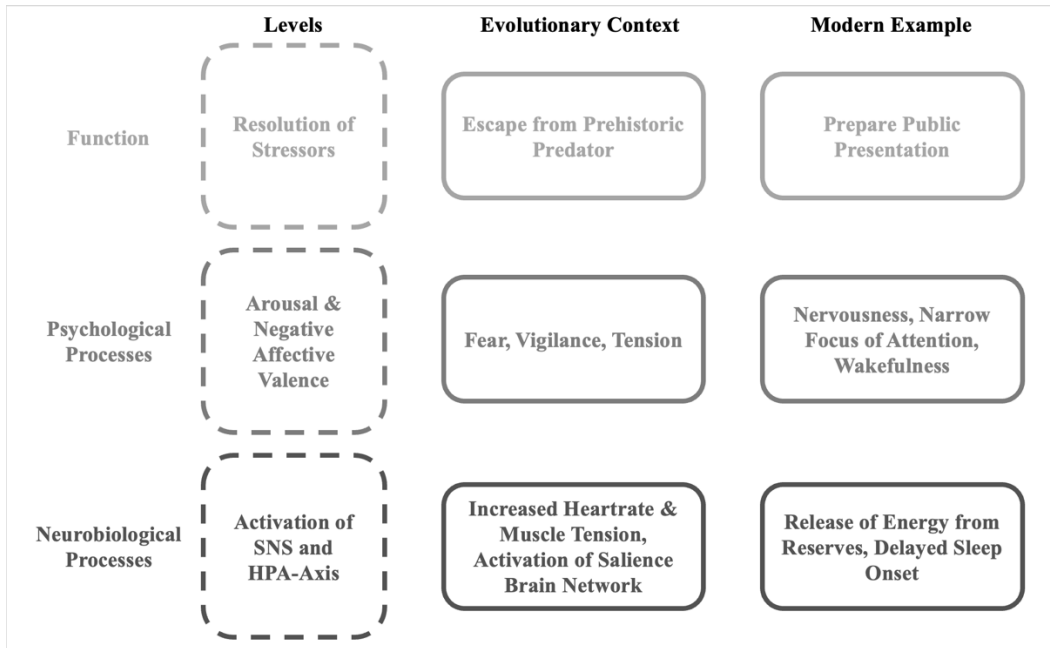
WHAT IS STRESS?

Stress is often defined as a state of fearful arousal in response to an environmental demand exceeding one's perceived ability to cope (i.e., the stressor; Lazarus 1966), but there is considerable variability with regard to its conceptualization (Crum, Salovey and Achor 2013) and operationalization (Cohen, Janicki-Deverts and Miller 2007). Theoretical debates are difficult to navigate for applied researchers, who try to decide what is important for *their* research question. We address this first challenge by outlining a simple but comprehensive framework of different levels of how stress can be conceptualized and then summarize how the elements of this framework can be implemented in consumer research.

Building on the recently formulated three levels of analysis in interdisciplinary marketing research (Clithero et al. 2024), stress can be viewed as a function, as a psychological process and as a neurobiological process (see figure 2). In what follows, we provide a brief overview of each level and explain the main takeaways and pitfalls for consumer researchers.

FIGURE 2

LEVELS OF ANALYSIS IN CONSUMER STRESS RESEARCH



Note: Levels of analysis for the consumer stress response (left), with two examples (solid boxes). In terms of abstraction, the “highest” level is the Function level and the “lowest” level is the neurobiological level. Based on Clithero et al. (2024).

Functional Level

Generally, stressful events—or stressors—can be defined as events, behaviors, and thoughts that are presumed to be taxing one’s ability to cope (Cohen et al. 2007). They can range from specific (recent) events to circumstances persisting over longer time periods (Shields et al. 2017; Toussaint et al. 2016; see also Figure 3, panels B and D). The functional level of analysis tries to identify stressors in the environment. For example, Behrman and Perreault (1984) presented a functional analysis of antecedents and consequences of stress in sales force workers. They identified several

job characteristics, such as lack of supervision and communication, that led to stress in the form of unclear goals and lowered the job performance of sales force workers. Low perceived control in the job was also found to be associated with stress-related health problem such as an increased incidence of coronary heart disease (Marmot et al. 1997). In the consumer context, Netemeyer et al. (2018) examined the role of financial decision-making in consumer mental well-being. They found that, for example, late payments or lack of long-term financial planning resulted in money management stress. To identify stressful life events more generally, different methods exist; one of these is the Stress and Adversity Inventory (STRAIN), a standardized assessment of stressors in people's life history (e.g. experiencing being laid off, divorce, or the loss of a loved one; Slavich and Shields 2018; see also Figure 3, Panel A).

Once a stressor is identified, reactions to it can be analyzed. For example, higher time pressure can lead to more mistakes during tasks that require careful decisions. However, not only may behavior be a reaction to stress, but stress can also lead to behavioral change, either positive (reducing stress by, for example, focusing on core tasks) or negative (unintentionally amplifying the stress by, for example, taking less time to communicate well).

A mere functional conceptualization of stress falls short of accounting for understanding why certain events trigger a stress response and individual differences in such responses. Consequently, it bears less explanatory power for individual well-being and behavior. This can be addressed by understanding the underlying processes on the psychological level and how they are implemented on the neurobiological level.

Psychological Level

On the psychological level, stress can be understood as the subjective experience of distress (Lesage, Berjot and Deschamps 2012) and related specific emotional categories such as nervousness, pressure, anxiety, worry, or threat (Watson, Clark and Tellegen 1988). An alternative conceptualization following the circumplex model of emotion considers stress as an affective state characterized by negative valence and high arousal (Bradley and Lang 1994). Generally, psychological stress is perceived and portrayed as a negative emotion. However, such focus on the dark side of stress neglects that stress also encompasses higher levels of energy and focus. This allows one, for example, to stay up awake at night to finish a presentation or submit a tenure package, even if it does not feel pleasant. One influential model to describe the balance of cognitive costs and benefits of stress proposes an inverted-U relationship of stress severity and cognitive outcomes. The model predicts that too little stress (i.e., being bored) can be experienced as aversive and reduce cognitive performance (Sapolsky 2015), whereas mild acute stress can enhance and promote performance (i.e., eustress; Burkhardt et al. 2023; Sandi 2013). It is important for consumer research to consider this positive, motivational side of stress (Crum et al. 2013).

The psychological level of analysis emphasizes the perception, processing, and appraisal of potentially stressful events. These processes add a subjective layer to the stress response—and lead to different reactions to the same objective circumstances (Lazarus and Folkman 1984; Peacock and Wong 1990). For example, attending a full concert venue might be stressful for fans who are coming only for the music but stimulating for fans who enjoy the experience of being part of a large crowd. Generally, there are important individual differences in stress perception, responses to potentially stressful events, and stress coping strategies (Duhachek 2005; Federenko

et al. 2006; Hendrawan et al. 2012; Matud 2004; Patrick, Lancellotti and Demello 2009; Ruvio, Somer and Rindfleisch 2014).

The power of perception and attitudes toward objective events is an important tool used in psychotherapy: cognitive behavioral approaches of stress management often focus not only on changing objective circumstances but also on the psychological appraisal of potentially stressful situations (e.g. Lewis, Yoon and Joormann 2018). For example, candidates may perceive a job interview as a selection process or as a matching process and, thus, as more (selection appraisal) or less (matching appraisal) stressful.

Neurobiological Level

On the neurobiological level, the acute stress response mainly recruits two systems: the sympathoadrenal (SAM) system and the hypothalamic-pituitary-adrenal (HPA) axis.

The SAM system can be understood as the body's rapid response unit: it is responsible for the fast activation and mobilization of body and brain to resolve an immediate stressor. Through the release of the hormones noradrenaline and adrenaline in brain and body it increases heart rate, breath pace, and muscle tension; mobilizes stored energy; and activates brain regions that help detect and process threat-related information. This all happens within minutes (see figure 3, panel C). In the metaphor of crisis response, the SAM system acts as a fire-fighter: it is an agile go-getter with strong priority on the most urgent tasks. Its blind spot, however, is tasks that are important but not urgent.

The HPA axis is responsible for maintaining balance in the body (homeostasis). The HPA axis stress response is characterized by a cascade of hormonal reactions, including the release of the hormone cortisol. While the effects of noradrenaline and adrenaline on the body are somewhat

linear, cortisol effects vary over time: early on (between 20 minutes and 1 hour after the stressor onset), cortisol is thought to amplify the fight-or-flight response (see figure 3, panel C). Put differently, it supports the immediate crisis response of the SAM system (Chrousos 2009).

However, cortisol is also part of a self-regulatory feedback loop: when cortisol is released it signals back to the homeostatic control center in the brain to slow down the stress response, preventing over-shooting. This means that under normal circumstances, the effects of stress on body and behavior decrease after sufficient time without any external intervention.

After at least one hour, cortisol can have opposite effects compared to the rapid stress response. Specifically, it leads to the activation of brain areas that are responsible for self-control, planning, memory, and problem-solving. This facilitates the long-term resolution of problems following the short-term fight-or-flight response, as well as learning for the future (Hermans et al. 2014). In terms of our crisis response metaphor, the HPA axis is crisis management: it takes over after the immediate firefighting and helps transition from the immediate crisis response to a more strategic crisis management and crisis prevention.

Unfortunately, just like those of a crisis response team, the capacities of our stress response are limited. If the stressor is excessive in magnitude (i.e., traumatic stress) or duration (i.e., chronic stress), the ability of our body to adapt to challenges attenuates and can cause lasting damage. This is reflected, for example, in an oversensitive HPA axis that is no longer able to maintain the balance between normal and crisis mode (Juster, McEwen and Lupien 2010; McEwen 2017; McEwen and Sapolsky 1995).

Stress on the neurobiological level can be measured with a variety of physiological and peripheral markers, the most important being heart rate, heart rate variability, and skin conductance (Lazarus, Speisman and Mordkoff 1963); salivary cortisol (Kirschbaum and Hellhammer 1989);

other markers of SAM activity, such as alpha-amylase (Nater and Rohleder 2009; Rohleder et al. 2004), and immunological markers in the blood (Padgett and Glaser 2003). Generally, however, the presence of physiological stress markers should not be equated with the subjective experience of stress on the psychological level. For example, the pharmacological stimulation of stress-related hormonal markers generally improves mood (Goldberg, Hollister and Robertson 1983; Reuter 2002).

Similar to the psychological stress response, there are also important individual differences in the neurobiological stress response (Hendrawan et al. 2012; Uhart et al. 2006; Zänkert et al. 2019). Recent work on the neurobiological mechanisms suggests that individuals with a stronger biological stress response and with lower stress resilience have a less effective self-regulation loop of the HPA-axis. This means that their biological stress response is more likely to overshoot and that they struggle to exit crisis-mode (Ebner and Singewald 2017). Hence, for biological reasons, some consumers are more vulnerable to the negative consequences of stress that manifest especially at high levels of stress. Such biological differences may arise due to genetic and epigenetic factors (Daviet, Nave and Wind 2022).

A critical reader might argue that consumer research aims at understanding and predicting how consumers respond (in attitude and choice) to markets and marketing stimuli; to uncover systematic relationships on this level, it is not necessary to dive into hormonal systems and the brain. However, we argue that a broad understanding of how the stress response is implemented on the neurobiological level and its biological function can help researchers to make better predictions rather than relying on only the psychological and behavioral levels of analysis. For example, while it is intuitive that a consumer would show more risk-taking immediately after a stressful experience, it is rather surprising to find the opposite result 45 minutes later (Bendahan

et al. 2017). This result is also surprising from a psychological perspective, as consumers usually no longer perceive any stress at this point even for strong psychological stressors (see figure 3, panel C).

The fact that psychological functions such as the stress response are implemented by resource-constrained biological systems also helps us understand why stress can lead to good or bad outcomes depending on the context. This is very similar to the introduction of the concept of *ecological rationality* in decision theory (i.e., the notion that cognitive systems evolved for performance with limited time and energy): while fully rational choice appears more compelling than heuristics and biases in abstract analysis, this intuition reverses once we consider biological constraints to the cognitive computations that must be implemented in the brain (Gigerenzer and Selten 2002).

Studying Stress across Levels

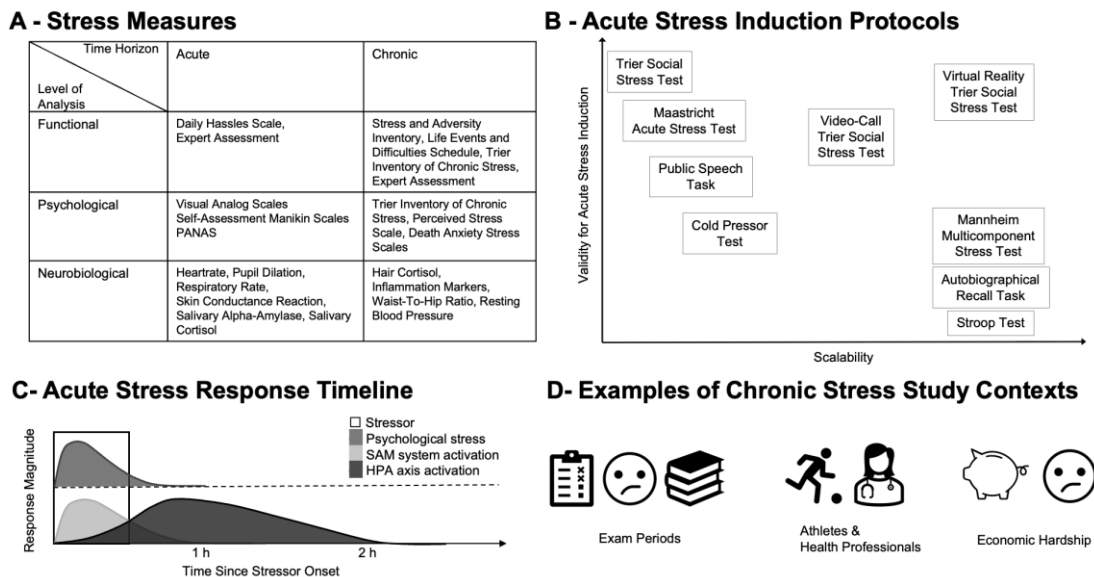
Research in social and biological psychology and neuropsychology has developed and validated various methods that can be used to study stress across different levels of analysis. Notably, these include various measures of stress that map onto the three levels discussed above. For example, different types of questionnaires exist to systematically assess stressors in consumers' lives (such as the STRAIN) and to capture their subjective experience of stress (such as Self-Assessment Manikin scales). On the biological level, we have various distinct markers of SAM-system (e.g., alpha-amylase, an enzyme found in saliva) and HPA-axis (e.g., salivary cortisol) activity. Importantly, beyond mapping onto the different levels of analysis, there also exist measures to assess stress across different time scales, that is, acute versus chronic stress. We

provide a summary of these approaches in figure 3. For more detailed descriptions see appendix B.

FIGURE 3

METHODS IN STRESS RESEARCH: CHEAT SHEET

Methods in Stress Research for Marketing Scholars: Cheat Sheet



Note: Panel A: Stress measures by time horizon and level of analysis. Panel B: Author assessment of acute stress induction protocols by scalability and validity (validated effectiveness across psychological and neurobiological levels of analysis). Panel C: Timeline of acute stress response across levels of analysis. HPA axis = Hypothalamic-pituitary-adrenal axis. Panel D: Examples of environments and occupations in which chronic stress is typically studied. See appendix B for a full list of references and more detailed descriptions of the measures and protocols.

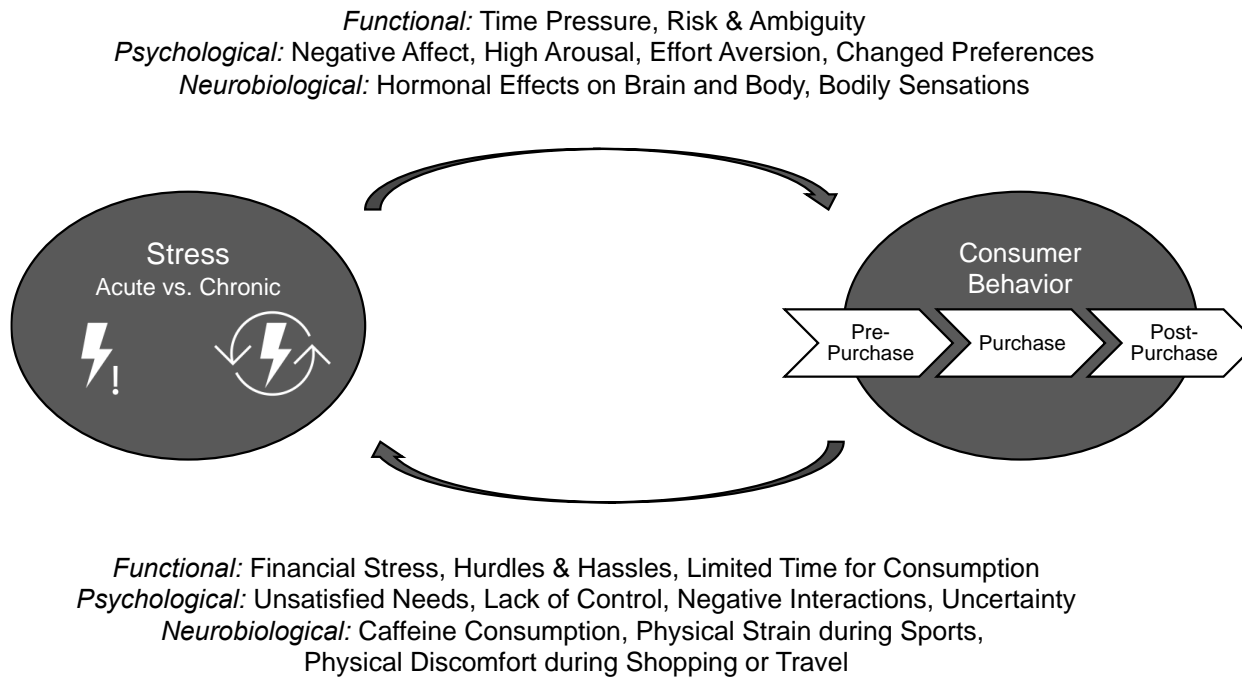
THE INTERSECTIONS OF STRESS AND THE MARKETPLACE

In this section, we apply the framework that we developed in the previous section to build a conceptual model of the intersections of stress and the marketplace.

Stress and consumer decision-making along the customer journey have a bidirectional relationship: stress alters the different elements of choices along the customer journey, and choices of marketers and consumers along the journey can increase or reduce stress (see figure 4). Investigating the different levels of analysis underlying this bidirectional relationship outlined in the previous section allows us to draw a more complete picture of stress in the marketplace than previously suggested. For both directions, we built a 3 (stages of the customer journey) by 3 (levels of analysis) conceptual model that is in part built on previous findings (see Table 1) and also points to new testable hypotheses for future consumer research.

FIGURE 4

CONSUMER MENTAL STATE ALONG THE CUSTOMER JOURNEY



Note: The figure depicts the bidirectional relationship of stress and consumer behavior along the customer journey. We reviewed the marketing literature and adjacent fields and analyze how stress effects consumer behavior and how consumer behavior, in turn, affects stress and mental well-being across the functional, psychological, and neurobiological level of analysis. This analysis yields a novel framework as well as testable predictions for consumer stress research.

Influence of Stress on Consumer Behavior

Pre-purchase Stage. The pre-purchase stage comprises behaviors such as need recognition, consideration, and search (Lemon and Verhoef 2016); we can identify an influence of stress on all of these across the different levels of analysis of our framework.

On a functional level, stressful situations encompass life challenges that the consumer must cope with (Netemeyer et al. 2018; Slavich and Shields 2018). These challenges can translate into new or different consumer needs. For example, when facing financial stress, consumers might need financial products that offer them liquidity, or when separating from a partner they might need to find new housing. Generally speaking, consumers will focus on needs over wants when they face constrained resources (Durante and Laran 2016) and will prioritize work and production of resources over leisure goods and services (Nickols and Fox 1983). We would, therefore, predict that stressed consumers show a reduced preference for luxury items and brands, unless these items and brands are perceived as a need within a specific social context (such as, e.g., a strong social norm to wear luxury clothes at an event). Further, stressful situations are often characterized by urgency and time pressure. This imposes objective limits on how much time consumers may spend on considering different product options or searching for product information. It suggests, for example, that users might conduct a less extensive search during online shopping and instead focus on products that are presented on the first page of search results. More generally, we can predict that consumers will show a stronger preference for products and services that help them mitigate or adapt to time pressure. For example, they might consider e-scooters or rental bikes to reach a destination faster or buy ready-to-eat meals to save time on cooking.

On the psychological level, stress is characterized by perceived uncertainty and lack of control. This psychological response reinforces the focus on products that guarantee the

satisfaction of needs, as described by the functional level. But beyond that, psychological stress might also trigger the desire for products and services that reduce the *feeling* of uncertainty. For example, stressed consumers are more motivated to use “pacifying” products such as their smartphones (Melumad and Pham 2020). Further, psychological stress is characterized by negative affect (Russell 1980). Hence, stressed consumers engage in consumption coping to mitigate their negative emotions (see also Chen and Pham 2018; Duhachek 2005; Duhachek and Iacobucci 2005; Ruvio et al. 2014). An example of a consumption-as-coping response is “retail therapy,” a phenomenon in which sad consumers show an increased preference for indulgent self-treats, which reduces residual sadness (Atalay and Meloy 2011; Rick, Pereira and Burson 2014). This emotion-focused response to stress, therefore, might lead to opposite effects (i.e., a stronger focus on wants) as compared to the problem-focused response that we discussed on the functional level (i.e., a stronger focus on needs). Based on this we predict that individual differences in psychological coping strategies will lead stressed consumers to either prioritize needs, to in order keep their resources together, or wants, in order to improve their mood. Given that attentional selection exhibits a mood congruency bias (Becker and Leininger 2011), negative affect during stress may lead consumers to pay more attention to negative information in their search. Based on this we predict, that stress effects on consumers during the pre-purchase stage will be similar to the effects of negative affect for consumers with a negative stress mindset. However, it is important to note that while stress often encompasses negative affect, not all stress is experienced negatively (i.e., eustress) and not all negative emotions are stressful (e.g., boredom, sadness, anger).

Another finding in psychological research is that stress tends to impair memory recall (Kuhlmann, Piel and Wolf 2005). In the consumer context, this might impair brand recall and affect how consumers construct their consideration set. Hence, especially in situations where

consumers do not select from a fixed menu of options but must generate options themselves (see Zhang et al. 2021), this might lead consumers to be more likely to consider brands at the top of their minds instead of preferred brands.

To evaluate information under time pressure, stressed consumers will apply less stringent criteria (Dror, Basola and Busemeyer 1999; e.g. Mormann et al. 2010) and rely more on heuristics shortcuts (Rieskamp and Hoffrage 2008). In line with this, we know that stressed consumers are more risk- and reward-seeking in their preferences, and are more likely to use disadvantageous decision strategies (Starcke and Brand 2016). However, these effects may be moderated by the subjective perceptions of the negative consequences (Belli et al. 2024). This has potential implications for how consumers evaluate financial products, which they are likely to consider in times of financial stress, as outlined in the functional analysis above. Specifically, we can predict that stressed consumers are more vulnerable to considering and falling for suboptimal financial options.

On the neurobiological level, acute stress has been shown to decrease recognition of one's bodily sensations (Fairclough and Goodwin 2007), which seems to be driven primarily by SAM activation (Schulz and Vögele 2015). Translated to the consumer context, this might lead to consumers having a less accurate perception of their bodily needs (such as hunger or need for rest). Chronic stress, however, might lead to an increased focus on bodily sensations (Schulz and Vögele 2015). For example, consumers with chronic stress might feel their fatigue or hunger more intensely.

Further, both acute and chronic stress have been shown to impair goal-directed attention in favor of stimulus-driven attention (Liston, McEwen and Casey 2009). This influences which products and services consumers consider, what they will pay attention to in their evaluation, and

how they search for information (Milosavljevic and Cerf 2008). Stressed consumers might, therefore, be more attentive to sensory marketing actions.

With respect to food-related needs in particular, the neurophysiological perspective offers two unique novel predictions for need recognition. On the one hand, the acute stress response and, specifically, the activation of the SAM system causes a downregulation of the digestive tract, which induces reduced appetite in anticipation of a stressful event. On the other hand, the acute stress response also leads to an expenditure of stored energy in the form of glucose. Hence, in the aftermath of stress consumers may recognize an increased need to replenish their energy storage via food intake.

With respect to financial preferences, the simultaneous pharmacological activation of the HPA axis and the SAM system has been shown to reduce loss aversion (Margittai et al. 2018). This suggests that shortly after the experience of stress, when both systems are activated simultaneously during the acute stress response, consumers might be less sensitive to potential financial losses. Since financial losses themselves can be a cause of stress, consumers might be more willing to tolerate further losses after previous losses in their financial decision-making, a phenomenon that is described in the gambling literature as loss-chasing (Zhang and Clark 2020). It is an open question whether there is a similar dynamic in consumer financial decisions.

Purchase Stage. The purchase stage encompasses consumer choice, ordering or the process of purchase more generally, and payment (Lemon and Verhoef 2016), which are all similarly affected by stress.

On a functional level, stressful events and environments pose a barrier to consumers implementing their choices and completing their purchases. For example, perceived crowding in

shopping malls reduces the intention to enter shops (Baker and Wakefield 2012) and increases the likelihood of abandoning the shopping trip (Albrecht, Hattula and Lehmann 2017). Shoppers facing unpredictable situations may also prefer online shopping. For example, a recent study demonstrated that COVID-19 eliminated consumers' preference for nearby products and services (Kwon, Manikas and Barone 2022). As another example, times of upheaval have been linked to the disruption of typical shopping habits (Wood 2010).

On a psychological level, several previous studies have found that acute stress leads to a reduced willingness to exert physical effort (Forbes et al. 2022), which could explain the above-mentioned findings on the functional level. But beyond overcoming hassles and hurdles during a shopping trip, the psychological-level analysis further suggests that stressed consumers also struggle with exerting mental effort (Bogdanov et al. 2021), such as during choices that require self-control. For example, (chronically) stressed consumers display overconsumption of high-calorie foods, more snacking, and a breakdown of healthy dietary efforts (Habhab, Sheldon and Loeb 2009; Langlois and Chandon 2023; Lunardo, Jaud and Jaspers 2022; Oliver and Wardle 1999; Tezer and Sobol 2021; Zellner et al. 2006). These changes in eating patterns have been linked to self-control failures. Finally, through the psychological perspective of analysis we can further predict that consumers might avoid shopping and purchase contexts in which they potentially face social evaluation by others. Palmer and Schwan (2022) argued for ethical permissibility of deploying AI-powered care-bots in medical contexts in which consumers would otherwise not seek out and receive appropriate care out of shame about disclosing their medical conditions. It is an open empirical question to identify such contexts, in which consumers might prefer to discuss medical or otherwise sensitive issues with chatbots rather than other people.

On the neurobiological level, stress has been linked to a shift from goal-directed to habitual action selection during a hormonal stress induction leading to activation of the SAM system and HPA axis (Schwabe et al. 2010; Schwabe and Wolf 2010, 2011). Similarly, chronic stress impairs goal-directed action selection in the brain (Dias-Ferreira et al. 2009). This suggests that rather than choosing the option of highest subjective value, stressed consumers might make their choices more automatically based on decision shortcuts (e.g., choosing the same set of items as always). Note, however, that recent work has demonstrated the importance of considering boundary conditions for these effects such as individual differences in stress reactivity and cognitive capacities (Smeets et al. 2023).

Post-purchase Stage. In the post-purchase stage, consumers engage in consumption or use, submit service requests, and share their experience with others.

Stress, on a functional level, presents a substantial barrier to the consumption and enjoyment of hedonic goods, specifically. Since consumption is focused on the satisfaction of needs and time resources might be constrained, consumers reduce consumption of goods and services that require a time commitment to fully realize their value but do not immediately satisfy needs (see also Nickols and Fox 1983). Time constraints might also prevent them from submitting reviews or sharing their experiences online, neither of which immediately serves consumers' own needs.

From the psychological perspective, stress has been linked to reduced shopping satisfaction (Eroglu and Machleit 1990; Machleit, Eroglu and Mantel 2000) and, in turn, reduced likelihood of spreading positive word of mouth (Das and Varshneya 2017). As a downstream consequence of time pressure during the purchase stage, we predict that stressed consumers will regret more of

their decisions and see them as mistakes, especially for difficult choices (Lee and Usher 2023; Mormann et al. 2010). Other work suggests that stress shifts learning from understanding and reflection to the development of ruts and habits (Wirz, Bogdanov and Schwabe 2018). Hence, an open question for future research is whether stressed consumers are more likely to continue buying comfort products and brands, or if the stress disrupts their habits. More generally another open research question is whether stress might bias consumers toward inaction (de Berker et al. 2016). For example, would consumers experiencing stress be less likely to cancel or change subscription plans, even if that is suboptimal or disadvantageous for them?

From the neurobiological perspective, previous work has found that acute stress changes reward processing (Porcelli, Lewis and Delgado 2012): stressed consumers show decreased neuronal sensitivity to monetary outcomes and a lack of differential activity between rewards and punishments. Further, while stress has been linked to increased neural signals in brain areas encoding preferences before consumption, it has also been associated with decreased neural signatures in these areas during consumption (Kumar et al. 2014). In line with this, acute stress has been thought to impair reward sensitivity signals in the brain and induce anhedonia, which is possibly a factor for why stress increases depression risk (Berghorst et al. 2013; Bogdan and Pizzagalli 2006). Related to consumer behavior, Biswas, Szocs, and Abell (2019) found that the physical stress caused by the vestibular sensation of standing reduces the enjoyment of food. Based on these findings, we hypothesize that the activation of the acute stress system leads to consumers making more purchases they subjectively consider mistakes post hoc, increasing returns and decreasing positive word of mouth.

Neuroscientific findings about the relationship between acute stress and learning are inconsistent. Theoretical work has suggested that stress can enhance learning and memory when

stress is experienced in the context and around the time of the event that needs to be remembered. This is because the stress hormones and transmitters that are released exert their actions on the brain areas as those activated by the situation (Joëls et al. 2006). The activation of the stress response could therefore facilitate the memory encoding of negative consumer experiences. Given that stressed consumers remember their experiences better, we predict that this will reflect in the vividness and specificity of any online reviews they might write.

Influence of Consumer Behavior on Stress

Pre-purchase stage. Barriers such as information and choice overload during information search and evaluation of different alternatives pose stressors from a functional perspective.

On the psychological level, we further know that stress arises most likely when consumers face high levels of uncertainty and perceive that they have little control (Dickerson and Kemeny 2004; Greco and Roger 2003). This suggests that the pre-purchase stage can be stressful for consumers above and beyond being a barrier for purchasing. For example, fast-fashion systems are characterized by enhanced product design capabilities and minimal production times to meet the complex and volatile demand for “hot” fashion items (Cachon and Swinney 2011). Hence, fast fashion reduces hassles and barriers and should, therefore, reduce stress according to the functional perspective. However, at the same time, fast fashion creates an environment of uncertainty where consumers have to *buy fast* in order to not miss the latest trends (Cachon and Swinney 2011). Consequently, product consideration and evaluation feel increasingly out of consumers’ own control. We predict that this causes psychological distress, which could be tested in future research. In line with this, ethnographic studies document consumers’ distress with an ever-accelerating

fashion industry, resulting in oppositional movements such as the slow fashion movement (Husemann and Eckhardt 2019).

In the same vein, we predict that other consumption contexts that are characterized by high levels of uncertainty, such as e-commerce (Karmarkar and Jenkins 2020) and non-fungible token (NFT) auctions (Hofstetter et al. 2022), pose a stress potential for consumers. Findings on the neurobiological level further underscore the importance of uncertainty in triggering stress (Peters, McEwen and Friston 2017).

Purchase stage. As during the pre-purchase stage, consumer choice and purchase may be stressful as they pose barriers to the consumer such as difficulty finding a preferred product in a store. On the functional level of analysis, the step of payment is especially important since consumers actively spend resources to finance their consumption. Hence, especially larger payments might cause financial stress to consumers. To avoid financial stress, many consumers choose to pay by credit card and borrow money for consumption. However, if this is done repeatedly and for expensive items such as luxury goods it might lead consumers into a vicious circle of consumption and debt (Moorhouse et al. 2023; Pettit and Sivanathan 2011).

The psychological-level analysis complements this perspective by highlighting the importance of social evaluation. Thus, it can be hypothesized that public purchase contexts, in which consumers potentially feel evaluated by others, evoke stress. Possible examples include buying luxury products, making food choices for others, or participating in a public auction. But even in the absence of social influence, purchase can cause negative repercussions for consumers due to the pain of purchase, that is, the immediate displeasure of paying the price (Mazar, Plassmann and Robitaille 2016).

If higher psychological stress becomes more frequent it can even lead to clinical consequences. An example is compulsive shopping, which is characterized by “excessive shopping and/or spending that leads to subjective distress and impaired functioning” (Black 2022). That means a compulsive purchasing act is driven by the need for relief from an distressing urge to buy rather than by the enjoyment of the acquisition (Clithero, Karmarkar and Hsu 2021). Compulsive shopping has been linked to multiple psychiatric disorders such as substance abuse and mood disorders and is itself considered an impulse control disorder according to the International Classification of Diseases, 11th revision (ICD-11). It is characterized by a cycle of binge consumption, withdrawal and negative affect, and preoccupation. Thereby, it directly or indirectly (e.g., through comorbidities) bears negative consequences for consumers.

From the neuroscientific perspective, the transition from goal-directed to habitual and increasingly compulsive behavior is accompanied by changes in activity in the brain’s valuation system (Clithero et al. 2021). With respect to the pain of paying during purchase outlined above, Mazar and colleagues used imaging data to show that this is affective, not physical, pain. This is an example where the neurobiological level of analysis can help to tease apart constructs that are difficult to differentiate using psychological data only.

Post-purchase stage. During the post-purchase stage, barriers are less likely to occur (besides during service requests), as the consumer has already completed the purchase. From the functional level of analysis, therefore, the consequences of consumption as well as post-purchase behaviors are more important. For example, acquisitions and consumer decisions that bind consumers’ time and resources beyond the moment of purchase might conflict with other consumer needs (e.g., Moschis 2007 mentions the decision to remodel one’s house). Similar to purchasing

behavior, consumption itself may become detrimental to well-being if it is compulsive or addictive in nature (Clithero et al. 2021; Fennis and Rucker 2023; Wansink 1994). One example is the excessive consumption of social media (Anderson and Wood 2021; Liu and Ma 2018; Müller et al. 2016), which has been documented to be a source of stress and reduced self-esteem (Wolfers and Utz 2022), especially for vulnerable adolescent users (Chua and Chang 2016; Lee et al. 2020).

Another important example is compulsive eating or food addiction, which is characterized, for example, by overeating, withdrawal symptoms, persistent desire, and unsuccessful attempts to reduce consumption (Hone-Blanchet and Fecteau 2014). Research suggests that about one-fifth of obese people meet the criteria for food addiction, and that food addiction symptoms are associated with a higher body mass index and higher depression scores (Pursey et al. 2014).

An interesting direction for future research is to investigate the psychological effects of social media and review platforms on consumers who share their customer experiences. This is because certain social media and review platforms (1) require consumers to share their identity, (2) make review content public, and (3) allow other users to evaluate and rate the helpfulness and quality of reviews. Thus, consumers who decide to submit a review might subsequently face public social evaluation themselves and, therefore, experience stress. Further, besides the active social feedback that consumers receive from others, social media also facilitate social comparisons. That means that, for example, when consumers share a photo of their new outfit on Instagram, then their satisfaction will be affected by how other people react to their photo (i.e., active social feedback), but also by comparisons to other people who posted their outfit. This in turn has implications for the decision about whether to share the review at all and what content they might share. Further, we predict that consumers who post their purchase on social media and subsequently engage in

upwards social comparisons with other users will be less satisfied with their purchase than consumers who do not post on social media.

A neurobiological analysis of the post-purchase stage reveals several other triggers of consumer stress that do not intuitively follow from either a functional or psychological analysis, and in some cases stand in apparent contradiction. Various consumer goods and services trigger the physiological stress response even if they are not always perceived as stressful. One example of such paradoxical effects is the consumption of recreational drugs and related psychoactive substances that are associated with relaxation, such as coffee or cigarettes. Importantly, while the ritual or habit of drinking a cup of coffee or smoking a cigarette might feel relaxing on a psychological level, the psychotropic substances contained in these drugs activate the physiological stress response, including the HPA axis (Mendelson et al. 2005; Patz et al. 2006).

A similar paradox occurs for doing sports. On the one hand, sports and exercise are often promoted as ways to relieve stress and improve resilience. For example, many consumers go to the gym to balance out their stressful work lives. On the other hand, past research has shown that acute exercise activates the physiological stress response proportional to the intensity of training (e.g. Luger et al. 1987). A crucial difference with recreational drug usage, however, is that exercise is indeed beneficial in the long run; many studies suggest that regular exercise is linked to improved mental well-being, reduced risk of depression, and a blunted response to acute stress (e.g. Childs and de Wit 2014; Silverman and Deuster 2014). This highlights the importance of the time scale in the analysis.

The general principle underlying these paradoxical effects is that some environmental, physical, or chemical factors are hardwired to trigger the stress response, independent of our subjective perception. Hence, especially for products, services, and activities that are perceived

positively on a psychological level, consumers tend to neglect the effects they may have on their bodies. Other examples might include airplane travel to a holiday destination, standing in line for a concert, going shopping in a crowded mall, or even eating certain types of food containing stimulating ingredients (Lopresti, Smith and Drummond 2022). Importantly, undetected biological stress can still affect consumer behavior via the aforementioned direct biological pathways. Also, if consumers are unaware of these effects, they cannot counteract them.

Overall and across the three stages of the customer journey, it is important to consider that some consumers are more vulnerable to experience stress than others. On the psychological level, some consumers are more likely to perceive situations as stressful. For example, we predict that specifically consumers with lower cognitive control are more likely to experience stress during the customer journey. Similarly, on the neurobiological level, some consumers carry a biological risk to show a more pronounced and lengthy stress reaction. This risk is associated with hereditary factors, sex hormone levels, as well as life history stress exposures.

CONCLUSION AND IMPLICATIONS

Stress is ubiquitous in consumers' everyday lives. However, consumer research has only begun to understand the many intersections of stress in the marketplace. The current review developed an interdisciplinary, multilevel conceptual framework of stress. We then applied this framework to how stress affects consumer behavior and, vice versa, how stress might be triggered and mitigated along the customer journey.

Based on our framework, we suggest novel directions for future consumer research. Whereas most of the previous consumer research has investigated the relationship between stress and consumer behavior on the functional and psychological levels of analysis, only one paper has

explicitly considered the neurobiological level (Durante and Laran 2016). Therefore, in the current paper we outlined concrete examples showcasing how the integration of the neurobiological level can inform, constrain, and complement theorizing in consumer behavior on the psychological and functional levels. Concretely, considering the neurobiological level allows us to make novel and counterintuitive on the relationship of stress and consumer behavior. Additionally, it helps to identify potential moderators and boundary conditions such as life history stress exposure and stress reactivity that characterize particularly vulnerable consumers.

To facilitate this integration of the different levels of analysis, we provided a primer on different multidisciplinary approaches to studying and measuring stress. For example, previous research in biological psychology has established an array of validated acute stress protocols for which the stress response on the psychological and neurobiological levels is relatively well understood (Bali and Jaggi 2015). These protocols allow researchers to induce a specified psychophysiological state of psychological stress, as well as elevated SAM and HPA activity. Experimental manipulations of chronic stress are rarely ethically acceptable in human research. Hence, investigations of chronic stress might leverage observational data and natural experiments (see figure 3, panel D).

Implications for Consumers

From our analysis, it follows that consumers need to be aware of the impact of stress on their decisions. While further research is necessary to improve our understanding, some general tendencies emerge. For example, since stress promotes bottom-up and automatic processes, consumers might become more receptive to sensory marketing, such as the smell of a delicious cookie potentially limiting a consumer's ability to resist the temptation to buy it. Another example

would be a limited motivation to exert effort that might lead to a lower willingness to cook a healthy meal versus buying fast food.

Against this background, consumers might need to develop their own idiosyncratic pre-commitment strategies (e.g. Ariely and Wertenbroch 2002; Crockett et al. 2013; Schwartz et al. 2014; Studer et al. 2019). Such strategies entail restricting one's future choice sets to avoid temptations and misjudgments in the moment. Past research has shown that this strategy is perceived as especially valuable to consumers under stress (Raio and Glimcher 2021). Concretely, this could mean timing shopping trips for relaxed periods and ordering online instead of going to a crowded mall to avoid the stress experienced during shopping. Further, users might block social media apps and fast-food websites from their phones during stressful life periods (e.g., exams, the work week before holidays).

In addition, real-time interventions to alter the acute stress response could help consumers to debias their decision-making processes. For example, taking just a few more minutes to recover from stress before making decisions could make a substantial difference for one's available cognitive resources (Hermans et al. 2011).

Last, given the general tendency toward reduced enjoyment during the customer experience under acute stress, consumers might benefit from delaying hedonic consumption under stress (but note, that this seems to be different for sadness; see Rick et al. 2014).

Implications for Marketing Managers

This review indicates that stressed consumers should be considered a vulnerable group, specifically because elevated stress levels are related to poverty and discrimination (Haushofer and Fehr 2014). Marketing to this group therefore requires conscious and ethical business practices.

Additionally, from a profitability perspective, it might be important for companies to integrate stress better in their marketing activities. For example, food companies might mistakenly target stressed consumers as they tend to show increased craving for high-calorie foods. However, since stress also reduces enjoyment, these consumers are more likely to be dissatisfied with their meals and thus develop a negative attitude toward the company and share negative word of mouth (Montgomery et al. 2018). Anecdotal evidence for this idea comes from fast food companies whose business skyrocketed during the COVID-19 pandemic but struggled to maintain their success in the aftermath (Kolf 2023).

Marketers have multiple levers to enhance consumer well-being. One important lever is that an easy and frictionless consumption experience reduces consumption stress (Miller, Kahn and Luce 2008): user experience design is a win-win strategy. Further, an efficient market and an accessible supply of consumer products that allows consumers to satisfy their needs better and more easily can substantially reduce a major source of life stress for consumers.

Another lever is offering products and services that address the psychological drivers of stress, such as perceived uncertainty, lack of control, and social evaluation. For example, products that empower consumers—such as feedback platforms (Kozinets, Ferreira and Chimenti 2021) and communication technologies (Tian et al. 2014)—can increase their perceived control, reduce stress, and improve mental well-being. Further, the deployment of artificial intelligence and chatbots might enable consumers to seek services they would otherwise avoid out of fear of negative social evaluation. This is highly relevant in medical care, for example, for conditions that consumers might be embarrassed to discuss, such as sexually transmitted infections (Palmer and Schwan 2022).

Beyond this, companies must be self-aware about whether their products have the potential for maladaptive consumption. As in industries selling classic addictive substances (e.g., tobacco, alcoholic beverages), companies need to balance their profitability goals with societal ones. Paradoxically, the introduction of hassles and hurdles into the consumption process might in this case improve well-being. For example, apps exist that restrict social media access or degrade user experience to fight excessive social media usage (e.g., OneSec).

Finally, our review outlines comprehensively how consumer stress may be quantified across multiple level of analyses (e.g., via questionnaires and physiological measurements). Therefore, marketers who claim that their products and services improve the stress levels of their consumers should substantiate their claims by measuring stress. This is especially important, since only substantial rather than minor changes in consumer stress levels have the potential to mitigate negative effects on consumer health, well-being, and behavior.

Taken together, this review has important implications for both consumers and marketers and calls for future research to better understand stress in the marketplace.

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APPENDIX A: LITERATURE SEARCH

We searched three databases: Business Source Complete, APA PsycArticles, and Psychology and Behavioral Sciences Collection. We searched for articles published after 2007, the year the first review on stress in marketing was published (i.e., the publication year of a seminal review on stress and consumer behavior; Moschis 2007). We used the following search query, with key terms highlighted in bold:

“SU **stress** AND (SO “**Journal of Consumer Psychology**” OR SO “**Journal of Consumer Research**” OR SO “**Journal of Marketing**” OR SO “**Journal of Marketing Research**” OR SO “**Journal of the Academy of Marketing Science**” OR SO “**Marketing Science**”) NOT (SO “European Journal of Marketing” OR SO “Journal of Marketing Management” OR SO “Journal of Marketing & Communication” OR SO “Journal of Marketing Communications” OR SO “Marketing Science & Inspirations” OR SO “Journal of Marketing Education” OR SO “Journal of Marketing for Higher Education” OR SO “Journal of Marketing Theory & Practice” OR SO “Journal of Global Scholars of Marketing Science” OR SO “Journal of Marketing Thought” OR SO “Romanian Journal of Marketing” OR SO “British Journal of Marketing” OR SO “International Journal of Marketing Principles & Practices” OR SO “Portuguese Journal of Marketing” OR SO “Journal of Marketing Development & Competitiveness” OR SO “Journal of Marketing Behavior”).”

We additionally applied the following filters: English language, article type: journal article, journal type: academic journal. This yielded the list of 27 publications listed in Table S1.

APPENDIX B: ADDITIONAL INFORMATION FOR FIGURE 3

Panel A: Stress measures by time horizon and level of analysis

Daily Hassles Scale:

The Daily Hassles Scale was developed as an alternative to stressful major life event inventories. Hassles are irritating, frustrating demands that occur during everyday transactions with the environment (Holm and Holroyd 1992).

Stress and Adversity Inventory:

The Stress and Adversity Inventory (STRAIN) is an online stress assessment system that measures individuals' lifetime exposure to 96 different types of acute and chronic stress that affect health (Slavich and Epel 2010).

Life Events and Difficulties Schedule:

The Bedford College Life Events and Difficulties Schedule (LEDS) is widely used to assess exposure to psychosocial stressors. Interviewers collect detailed information about significant life events, including timing and context for each event. Then the threat level for each event is evaluated by multiple raters using standardized rating procedures (Brown and Harris 1989).

Trier Inventory of Chronic Stress:

The Trier Inventory of Chronic Stress (TICS) measures chronic psychosocial stress within nine factors: Work Overload, Social Overload, Pressure to Perform, Work Discontent, Excessive

Demands from Work, Lack of Social Recognition, Social Tensions, Social Isolation, and Chronic Worrying (Petrowski et al. 2012).

Visual Analog Scale:

The Stress Visual Analog Scale (VAS) consists of a small, unmarked 100 mm ruler with endpoints labeled “none” and “as bad as it could be.” The scale is introduced to participants with the following instruction: “Indicate how stressed you feel on the small ruler.” The scale yields a single subjective stress score between 0 and 100 (Lesage, Berjot and Deschamps 2012).

Self-Assessment Manikin Scale:

The Self-Assessment Manikin is a nonverbal pictorial self-report scale that directly measures the emotional valence and level of arousal (Bradley and Lang 1994).

Positive and Negative Affect Schedule:

The Positive and Negative Affect Schedule (PANAS) comprises two brief and easy-to-administer 10-item mood scales that measure positive and negative affect (Watson, Clark and Tellegen 1988).

Perceived Stress Scale:

The Perceived Stress Scale (PSS) is a self-report questionnaire that assesses the degree to which situations in an individual’s life are appraised as stressful (Cohen, Kamarck and Mermelstein 1983).

Depression Anxiety Stress Scales:

The Depression Anxiety Stress Scales (DASS) is a 42-item questionnaire measuring current (“over the past week”) symptoms of depression, anxiety, and stress. Each subscale consists of 14 items that are responded to using a 0–3 scale, where 0 = “did not apply to me at all” and 3 = “applied to me very much, or most of the time” (Brown et al. 1997).

Neurobiological Measures of Acute Stress

For an overview and discussion of neurobiological measures of acute stress we point to a recent review of the literature (Armario, Labad and Nadal 2020).

Neurobiological Measures of Chronic Stress

For an overview and discussion of neurobiological measures of chronic stress we point to two reviews of the literature (Juster, McEwen and Lupien 2010; Noushad et al. 2021).

Panel B: Author assessment of acute stress induction protocols by scalability and validity

Trier Social Stress Test

The Trier Social Stress Test (TSST) is the gold-standard protocol for the induction of acute stress in psychology. It consists of a preparation period, a mock job interview in front of a panel of confederates, and a subsequent mental arithmetic task. On a psychological level, the protocol induces stress through the uncontrollability of the situation for participants and the social evaluation during the interview. The TSST has been validated in hundreds of studies, and there exist several variations including a group version and a matched control procedure. The physiological response profile is well-documented and includes activation of both the SAM system

and the HPA axis. The TSST is difficult to scale due to the need for lab space and trained confederates and limits to how many participants can be tested simultaneously (including for the group version) (Kirschbaum, Pirke and Hellhammer 1993; Kudielka, Hellhammer and Kirschbaum 2007).

Video Call Trier Social Stress Test

More recently, some studies have explored the feasibility of delivering the TSST protocol via video call technologies such as Zoom. Initial results are promising and suggest that a video call-delivered protocol evokes similar psychophysiological responses as the in-person TSST. The video call TSST reduces required lab space and allows for the recruitment of nonlocal study populations, but still requires trained confederates and, therefore, imposes limits on simultaneous testing. Arguably, a video call also is less immersive than an in-person experiment, thereby missing more subtle facets (e.g., nonverbal behavior) of the stress induction protocol (Gunnar et al. 2021).

Virtual-Reality Trier Social Stress Test

The most recent development of a more scalable TSST is the availability of an open-source virtual-reality version. Again, initial results are promising and suggest that a VR-delivered protocol evokes similar psychophysiological responses as the in-person TSST. Importantly, while a VR protocol requires a more sophisticated technological setup, it automates the delivery to a large degree, thereby reducing the required confederates to one and eliminating the need for extensive training. Compared to the video call, a VR protocol is also more immersive and likely the closest possible match to the in-person TSST. As VR technology becomes more widely adopted, the VR TSST could enable large-scale stress testing (Linnig et al. 2024).

Public Speech Test

Several less standardized and non-validated variations of the TSST have been adopted in the literature. In most cases, these protocols focus on the element of public speech (i.e., social evaluation) but otherwise relax the protocol for logistical reasons. While implementing the complete TSST might be infeasible in some circumstances, using a non-validated protocol adds substantial ambiguity to the interpretation of the induced state. Generally, researchers should use non-validated protocols only if they can include manipulation checks, which might not be feasible for the neurobiological level (Durante and Laran 2016; Melumad and Pham 2020).

Cold Pressor Test

The Cold Pressor Test (CPT) is a physical stress manipulation in which participants immerse their hands in ice water for as long as possible (up to 3 minutes). The protocol reliably induces an activation of the SAM system but only minimally stimulates the HPA axis, and is subjectively perceived as painful rather than stressful. While the CPT is arguably easier to implement, logistically, than the TSST it does not reliably stimulate the full stress response (Mitchell, MacDonald and Brodie 2004).

Maastricht Acute Stress Test

The Maastricht Acute Stress Test (MAST) is a hybrid protocol of the CPT and the TSST that has been validated to trigger the full physiological stress response. Participants immerse their hands in ice water and solve a mental arithmetic task while being video-recorded. The MAST is a compromise option between CPT and TSST; it has more validity than the CPT for HPA-axis stimulation and lower logistical costs than the TSST. However the protocol simulates a rather

artificial situation and, therefore, might have drawbacks with respect to ecological validity (Smeets et al. 2012).

Mannheim Multicomponent Stress Test

The Mannheim Multicomponent Stress Test (MMST) is an easily administrable stress induction protocol that does not rely on social evaluation. Instead, it combines multiple stressful components: mental arithmetic, emotional pictures, and noise. Initial results are promising and suggest that the MMST evokes subjective stress as well as SAM-system and HPA-axis activation. Further, it is possible to fully automate the protocol and, potentially, deliver it online. A drawback of the protocol is the lack of a social-evaluative component, which is deemed important from a theoretical point of view. The validity of the MMST depends, therefore, on whether social evaluation is relevant to the research question being studied (Reinhardt et al. 2012).

Autobiographical Recall Test

Autobiographical recall tests are general-use mood and affect manipulations in consumer behavior studies. For a manipulation of stress, participants are asked to remember and write about all things that currently cause stress in their lives. While this manipulation has been shown to increase self-reported stress levels, it has not been validated on the neurobiological level. Conceptually, these tests also do not induce stress levels randomly, but instead the effectiveness of the manipulation is related to the stressfulness of participants' lives. Therefore, the protocol does not allow for a fully randomized manipulation of stress (Durante and Laran 2016).

Stroop Task

The Stroop task is a cognitive task in which participants must name the font color of words that may or may not include color names. Thereby, participants experience interference: it is more challenging for participants to correctly name the blue font of the word “red” than of the word “car” or “blue”. Due to its cognitive difficulty, the Stroop task might induce mild stress levels but has little validity from a psychological or neurobiological perspective (especially with respect to HPA-axis activation) (Renaud and Blondin 1997).

Panel C: Timeline of acute stress response across levels of analysis

For further reference on the timing of the psychological and physiological stress response, see Hermans et al. (2014) and Nitsch, Sellito and Kalenscher (2021).

Panel D: Examples of environments and occupations in which chronic stress is typically studied

For further reference on environments and occupations in which chronic stress is typically studied, see Dettenborn et al. (2010), Duan et al. (2013), González-Cabrera et al. (2014), Haushofer and Fehr (2014), and Landolt et al. (2017).

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