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REVIEW PAPER OPEN ACCESS

Terror Management Theory in the Consumer Domain: A Systematic Review and Meta-Analysis on Mortality Salience Driven Consumer Responses

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ABSTRACT

A systematic review and meta-analysis were conducted to examine terror management theory (TMT) in the consumer behavior domain. TMT postulates that existential anxiety (i.e., mortality salience) drives people to invest in anxiety buffers, affecting many different behaviors, including consumer responses. Due to the broad nature of these responses, we distinguished three categories: “I want more” (e.g., more money, brands, and products), “protect my culture” (e.g., preferring domestic and old products to foreign and new ones), and “pro-social” responses (e.g., donating or sharing money). One hundred and twelve experiments were included in the systematic review, which revealed a large variety in the studied dependent variables, randomly studied moderating variables, and inconsistent outcomes. Seventy studies (with 125 effect sizes) were included in the meta-analysis, which yielded a small but positive overall effect size ($g = 0.21$) of mortality salience on consumer responses, with similar results across the three categories (g between 0.13 and 0.30). While research in the TMT consumer domain is very dispersed, the analyses provide some support for the mortality salience hypothesis. We recommend researchers to further explore why certain consumer responses are evoked by mortality salience and make use of preregistered and high-powered experiments.

1 | Introduction

Human beings are often confronted with their mortality, either in their personal lives by the (imminent) death of loved ones, or by seeing depictions of war and threats in the media (Das et al. 2009; Jiang et al. 2021). Besides this general reminder of mortality, people also encounter death reminders in their role as consumers. This happens directly (e.g., being exposed to an ad for funeral insurance) and other times more indirectly (e.g., when seeing news about the danger of climate change when having a sandwich in a lunchroom). These encounters could very well impact their consumer behavior, as explained by the terror management theory.

The basic premise of terror management theory (TMT; Greenberg et al. 1986) is that humans have a natural urge to survive, but at the same time, they are aware that death is unavoidable. This awareness, also called mortality salience (MS), can be defined as “The awareness that life is finite and one’s death is inevitable” (Gobrecht and Marchand 2022, 5), which, according to TMT, can result in existential anxiety. To cope with this, people rely on two interrelated anxiety buffers. First, they immerse themselves in cultural worldviews, which provide life with meaning and purpose. Second, people strive for self-esteem by adhering to the standards of those cultural worldviews. Because cultural worldviews and self-esteem can function as mortality salience buffers, the reminder of one’s death (i.e., mortality

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salience, MS) increases the need for these protective psychological structures. This proposition is referred to as the mortality salience hypothesis and it has been tested in over 1500 studies (Chen et al. 2022). These studies have revealed a wide array of actions that can function as anxiety buffers, like increased prejudice, having children, voting, risk-taking, and consumerism (Burke et al. 2010).

Although there is much empirical evidence for MS effects and several meta-analyses suggested moderate-sized effects of MS (Burke et al. 2013, 2010; Martens et al. 2011), recently more critical reviews and replications have emerged. A large Many Labs experiment (Klein et al. 2022) failed to replicate a classic TMT finding (evaluating an anti- and pro-America essay; Greenberg et al. 1994). Though a re-analysis that excluded studies with too small sample sizes did find a small effect of MS on the essay evaluation (Chatard et al. 2020), yet another (Bayesian multiverse) re-analysis of the data found fairly robust evidence for the null hypothesis (Haaf et al. 2020). Furthermore, multiple other studies also failed to replicate findings of MS effects on a variety of worldview-confirming and -opposing essays (Rodríguez-Ferreiro et al. 2019; Sætrevik and Sjøstad 2022; Schindler et al. 2021; Treger et al. 2023). In line with this, a recent p-curve analysis indicated that MS effect-size estimates have been grossly overestimated, likely due to publication bias and questionable research practices (Chen et al. 2022). It is important to note that some of these replications have limitations in terms of sample or context (see Schindler et al. 2021 for an analysis of this); however, together these studies raise questions about the robustness and generalizability of MS effects. Importantly, none of these replication studies were conducted in the consumer domain, and consumer responses are not well represented in previous meta-analyses. Consequently, it is unclear whether the effects of MS on consumer responses hold up. Therefore, we conducted a comprehensive systematic literature review and quantitative meta-analysis. We will first discuss terror management theory in the consumer domain and what types of consumer responses have been studied, followed by a study overview outlining our specific research questions and how we will address them.

1.1 | Terror Management Theory in the Consumer Domain

Two decades ago, Arndt and colleagues published their often-cited paper “The urge to splurge,” theorizing the role of mortality salience in the consumer domain. The premise is straightforward: in our (Western) society acquiring wealth can be regarded as an important goal, shaping our materialistic cultural worldview. Or, as Arndt and colleagues put it, “Money is a pervasive barometer of self-worth, it tells us not only how much our car is worth, but how much we, as the person who holds the keys, are worth” (Arndt et al. 2004, 203). From this perspective, one’s wealth represents one’s value, indicating that when mortality is salient consumer choices function to comply with cultural standards and boost one’s self-esteem. Or, simply put, consuming can help us cope with our inevitable death. Within the consumer domain, various disciplines have studied aspects of consumer behavior and

worked with different definitions (Hoyer and MacInnis 2010). Because many of the studied consumer behaviors are not actual behaviors, but proxies, such as attitudes or intentions, we will use the term “consumer responses.” Based on the founding work on TMT in the consumer domain (i.e., Arndt et al. 2004; Maheswaran and Agrawal 2004), we define consumer responses as “responses regarding wealth, products, and money.”

Researchers have noted that it is unclear why people would turn to consumerism as an anxiety buffer when there are so many other coping mechanisms (Rindfleisch and Burroughs 2004) and that it is unclear what specific motivations drive these MS effects (Maheswaran and Agrawal 2004). Additionally, researchers have argued that existential threat does not impact people’s material life goals (Hui et al. 2014) and can lead to the pursuit of intrinsic goals (Rogers et al. 2019). Regardless of the underlying mechanisms, various empirical studies have demonstrated MS effects on different aspects of consumer responses. For example, it was found that participants exposed to death became greedier (Kasser and Sheldon 2000), more materialistic (Hussein et al. 2018), and valued money more (Zaleskiewicz et al. 2013a). Another way to suppress the fear of death is by turning toward products and brands that are highly regarded by peers; studies showed that MS led to an increased preference for high-status products (Heine et al. 2002) and increased spending intentions for luxury products (Chopik and Edelman 2014). Moreover, studies report that MS results in a higher preference for domestic over foreign products (Fransen et al. 2008; Friese and Hofmann 2008; Jonas et al. 2005). Other studies show that MS leads to a preference for familiar brands (Van Bommel et al. 2015), and increased spending intentions for various products (Das et al. 2014; Mandel and Smeesters 2008; Rindfleisch et al. 2009). Overall, these studies show that when mortality is salient, people become greedier and more materialistic and tend to cling to products, particularly those that support their cultural worldview (i.e., brand-, status-, and domestic products). Contrasting these findings of increased materialistic tendencies, other studies demonstrated that MS results in increased monetary donations (Cai and Wyer 2015; Jonas et al. 2002), increased intentions to donate possessions (Dunn et al. 2020), sharing more with others (Zaleskiewicz et al. 2015) saving as opposed to spending money (Zaleskiewicz et al. 2013b), and a decreased appreciation for money (Dong et al. 2019). These studies demonstrate that MS can lead to putting less value on acquiring wealth, contradicting the assumption that MS leads to materialistic tendencies.

Previous reviews also documented these divergent MS results in the consumer domain (e.g., Fransen et al. 2019; Gobrecht and Marchand 2022), and Gobrecht and Marchand (2022) suggested that these diverse outcomes may be due to different conceptualizations of MS. An additional explanation for the diverse consumer outcomes can be individual differences in worldviews and sources of self-esteem, or as the founding fathers of TMT stated: “the effects of MS are never really main effects” (Pyszczynski et al. 2015, 34). Here lies a challenge within the consumer domain: empirical studies have not investigated moderating variables consistently or systematically. Several studies have demonstrated that MS-induced consumer responses were stronger for people with low (vs.

high) self-esteem (e.g., Mandel and Smeesters 2008), but other studies did not find a moderating effect of self-esteem (e.g., Dunn et al. 2020, Study 5). Additional moderators that have been studied include materialism (Rindfleisch et al. 2009), world-view affirmation (Sullivan et al. 2011), social presence (Fransen et al. 2008), spirituality (Dong et al. 2019), and anti-consumption lifestyles (Nepomuceno and Laroche 2016). While many different moderators can play a role in MS-evoked consumer responses, a systematic overview of these variables is lacking.

1.2 | A Categorization of MS-Induced Consumer Responses

There is much evidence for the MS hypothesis, stating that a death reminder can lead to a variety of anxiety-buffering responses. On the other hand, recent meta-analyses and replication studies question this evidence and suggest much smaller effect sizes than previously assumed. Between the many TMT-focused studies in the consumer domain, numerous different types of responses are investigated, outcomes seem to contradict each other, and a variety of moderators have only been studied incidentally. One recent study by Gobrecht and Marchand (2022) also reviewed MS in the consumer domain. These researchers predominantly focused on the operationalization of MS, also looking at socioemotional selectivity theory, leading to a renewed definition of MS and a comprehensive future research agenda. The present research will focus on the *effects* of MS within the domain of TMT and complements previous qualitative overviews with a meta-analysis, providing a quantitative indication of the effect size of MS-induced consumer responses.

To create order in the vast volume of available studies, we developed a categorization of different consumer-related responses based on theorizing by Arndt et al. (2004) and the “guide to conducting TMT research” by Cox et al. (2019). Using worldview defense and self-esteem as the leading principles, we distinguish three types of consumer responses:

1. “I want more” *responses*. These are self-esteem-driven responses, based on the reasoning that “mortality concerns should often intensify materialistic desires in people for whom such pursuits are a salient barometer of self-worth” (Arndt et al. 2004, 203). Responses in this category are quite varied, and therefore four subcategories are distinguished: greed and materialistic tendencies, the appeal of specific brands and products, desire for status products, and money attitudes. The assumption is that MS leads people to require more money, more spending, and more products.
2. “Protect my culture” *responses*. These responses are related to the protection of one’s cultural worldview. According to Arndt and colleagues, “People should be more positively inclined to purchase those goods and services that support their cultural worldview and more negatively disposed to those goods and services that threaten to undermine faith in their worldview” (Arndt et al. 2004, 206). Responses in this category are linked to in- and out-group tendencies of preferring domestic over foreign products (subcategory

one) or product age (subcategory two). The assumption is that MS results in an increased preference for domestic and old products and a decreased preference for foreign products.

3. “Pro-social” *responses*. These responses are also related to one’s cultural worldview and based on the assumption that “cultural worldviews prescribe standards of universalism and benevolence” (Schimmel et al. 2019, 8) and as such, “reminders of mortality should generally encourage people to be more charitable to other” (Jonas et al. 2013, 48). Responses in this category are all related to two subcategories: charity donations (of money or possessions) and sharing money with others. The expectation is that, after MS people are more likely to donate money to charities and share money with others.

1.3 | Study Overview

As TMT-focused research in the consumer domain is so highly dispersed, the first focus of this paper is a comprehensive systematic literature review, to make sense of these differences and categorize the various responses, review the outcomes, and examine moderating variables. This is a stepping stone for a quantitative meta-analysis that will shed light on the overall effect size and explore differences for the various types of consumer responses. The current systematic review was, therefore, guided by the following questions:

- 1a. What are the different MS-induced consumer responses that have been studied?
- 1b. What moderators, impacting these MS-induced responses, have been studied?
- 2a. What is the strength of MS effects on consumer responses?
- 2b. What are the effect sizes for the different types of consumer responses?

In Section 2, we will provide information concerning the literature search inclusion criteria, variable coding, and meta-analytic approach. RQ 1a and 1b will be answered with the systematic literature review, followed by the meta-analysis aimed to answer RQ 2a and 2b. We will end with the discussion, followed by the conclusion.

2 | Method

For the literature search, inclusion criteria and reviewing of eligible studies, procedures were in accordance with frequently used approaches by other scholars in recent literature reviews (e.g., Gilal et al. 2019; Barari et al. 2021).

2.1 | Literature Search

We worked with an information specialist to formulate the search string (see Appendix A). To conduct a complete search

of all relevant literature, we followed the steps as listed by Xiao and Watson (2019). We conducted a database search with PsycINFO, Communication and Mass Media Complete, and Business Source Premier. Additionally, we searched for dissertations via the ProQuest Dissertations & Theses Global database. After going through the exclusion criteria, we performed a backward and forward literature search for all eligible articles.¹ Finally, we emailed all authors of the thus far included studies, asking if they had other relevant works they could share.

2.2 | Inclusion Criteria

We followed guidelines to include as much relevant literature as possible, both from as many journals as possible (Paul and Criado 2020) and in the form of other types of publications (i.e., books/book chapters, conference proceedings, dissertations; Xiao and Watson 2019) to minimize publication bias risks (Paul and Criado 2020; Templier and Paré 2015; Xiao and Watson 2019). Furthermore, our research questions guided our inclusion criteria (Kitchenham and Charters 2007). To be included in the present analyses, studies had to fulfill the following criteria:

1. The article had to be written in English.
2. The study had to employ an experimental design testing the MS hypothesis; a MS manipulation and a control condition needed to be included. This means that survey studies that didn't include an experimental manipulation of MS were excluded. Different types of MS manipulations could be employed, such as open-ended questions, a fear of death scale, or news articles. Some studies included additional conditions (such as "afterlife salience," or "mortality salience of a loved one"). As these additional conditions fall beyond the scope of our research, we only included the MS and control conditions and excluded any additional conditions.
3. The study had to measure a consumer-related dependent variable. We defined consumer responses as "responses regarding wealth, products and money," thus included responses consist of attitudes, intentions, and behaviors related to money, materialism, greed, material products, consumer brands, and advertisements for consumer goods. Because we followed the theoretical reasoning concerning consumerism as proposed by Arndt et al. (2004), we excluded products that could be considered related to other anxiety buffers, such as health (e.g., cigarette consumption), creativity (e.g., the purchase of arts and crafts products), or risk-taking (e.g., risky investment choices). We held this as a rule and followed the reasoning of the original authors (i.e., in the creative consumption example, buying arts and crafts products was an operationalization of "creativity," Xu et al. 2013). Concerning the pro-social responses, studies were only included when dependent variables were related to spending money.
4. Sufficient statistical information had to be provided, either in the paper or by the authors on request. When a paper contained insufficient statistical information, we contacted

the lead author via email. In case of no reply, we sent a one-time reminder.

Figure 1 depicts a flow diagram showing the process of study selection. Duplicate records were carefully checked and removed (Templier and Paré 2015). A total of 4052 records were screened based on titles and abstracts, resulting in 200 articles that were fully screened for eligibility. In the systematic review, 60 publications were included, with a total of 112 studies. Some studies contained insufficient statistical information for the meta-analysis; therefore, 42 publications with 79 studies could be included in the meta-analysis.

2.3 | Variable Coding and Intercoder Agreement

All 200 potentially eligible articles were independently coded by two of the authors. This resulted in an overall agreement of 95.85% (Cohen's k : 0.90; almost perfect agreement, Landis and Koch 1977). Disagreements consisted of five questions about whether a dependent variable was considered a consumer response and three questions about whether the article experimentally tested the MS hypothesis. For all disagreements, discussions resulted in a consensus between all authors. While this does not eliminate subjective bias, it restricts the extent (Belur et al. 2021).

Together with two assistants, all 112 studies were coded double and checked by the first author. Studies were included in one of the three categories and one of the matching subcategories. Several sample characteristics were coded: gender, age, sample type (i.e., student sample vs. general sample), and sample origin (i.e., European, North American, Asian). Regarding the study design, we coded manipulation type (i.e., writing task, applied stimulus, other general), control group type (i.e., neutral, aversive), and number of delay tasks. Finally, regarding the dependent variable, we coded the DV type (i.e., attitude, intention, behavior) and DV measure (i.e., scale, choice, open-ended). Intercoder reliability could be calculated for most variables, resulting in Krippendorff's Alpha scores ranging from 0.81 to 1.00. These scores are all considered a satisfactory level of agreement (Marzi et al. 2024). Disagreements were resolved through discussion between the authors. See Appendix B for the full results (Table B1).

2.4 | Meta-Analytic Strategy

To synthesize previous experimental research into the effects of MS on consumer responses, a three-level meta-analysis was conducted. Compared to the traditional two-level meta-analysis (which aggregates effect sizes across studies), a main advantage of three-level meta-analysis is that it does not require only one observed effect size per study (e.g., Van den Noortgate et al. 2013). Studies often measure multiple DVs, forcing researchers who conduct a two-level meta-analysis to average the multiple DV scores per condition. Three-level meta-analyses, however, account for heterogeneity both across studies and across the included DVs per study and can therefore provide a more precise effect estimate (e.g., Van den Noortgate et al. 2013).

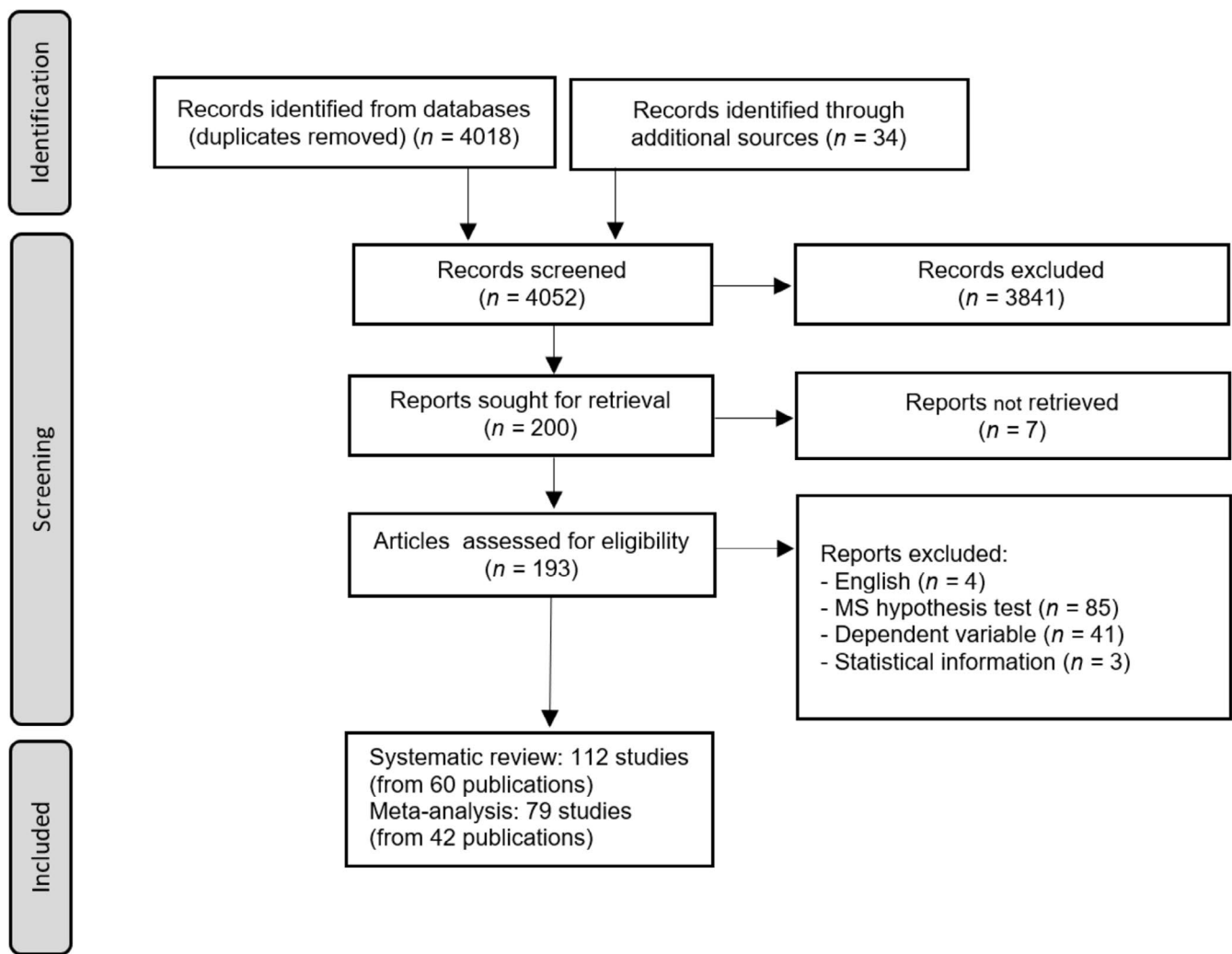


FIGURE 1 | PRISMA flow diagram of article selection.

In our meta-analysis, we thus extracted standardized effect sizes (Hedges' g) for each dependent variable in each included study. When possible, we used the means and standard deviations per condition. If these were unavailable, we either used the t -value or Chi-square value belonging to the MS and control comparison or percentages provided per condition. Occasionally, only the means and standard deviations per condition for specific values of a moderator (e.g., another experimental manipulation) were reported. In these cases, we calculated a weighted average of the mean for each condition and pooled the standard deviations. Sometimes, the specific number of participants per condition was not reported. In these cases, we computed the n per condition by dividing the total sample size by the number of conditions. When insufficient statistical information was available, we sent the authors of the publications statistics requests.

Next, to assess whether the research on consumer responses found statistical support for the MS hypothesis, it was determined whether each Hedges' g was positive (i.e., in line with the MS hypothesis) or negative (i.e., inconsistent with the MS hypothesis). For the "I want more" responses category that entails that MS would lead to more materialistic tendencies in general and for the subcategory "product status" to an increased preference for high-status products (but no effect on low-status

products). In the "protect my culture" category we assumed MS would lead to an increased preference for domestic goods and a decreased preference for foreign goods and an increased preference for old products (but no effect on new products). Finally, for the "pro-social" responses we presumed MS to lead to more donations and sharing. Effect sizes have been calculated for the predicted variables.

To avoid values that would have a disproportionate impact on the overall effect estimate, outliers were identified based on the effect sizes' 95% CI confidence intervals. Only five outliers were found, which were subsequently excluded from the analysis. In the end, 125 effect sizes were included. The effect sizes originated from 42 publications that reported a total of 79 relevant studies. The total number of observations in these studies was 22,371.

Finally, to conduct the three-level meta-analysis, a random-effects model was fitted on the Hedges' g s with the metafor package in R (version 2.4-0; Viechtbauer 2010). A random-effects model tends to be preferred over a fixed-effects model because the former assumes that the true effect size may vary across studies due to differences in characteristics of the samples, manipulations, et cetera, while the latter assumes homogeneity of

studies (Anker et al. 2010). Because the current meta-analysis examined a broad range of different DV categories, a random-effects model seemed most appropriate. The data, R code, and output, as well as documentation of inclusion decisions and codebook, are available on the Open Science Framework: https://osf.io/c94gs/?view_only=17114588a588424ab605e988f26a3477.

3 | Systematic Literature Review

This review aims to answer RQ 1a and 1b by categorizing the many different consumer outcomes, describing authors' expectations and reported results, as well as examining the included moderators. A total of 112 studies will be discussed. Several studies reported effects with p values between 0.05–0.1, but we only interpret a finding as significant if the p value is below 0.05. Sometimes results revealed interaction effects, but when further analyses showed that none of the group differences were significant at a 0.05 level, these were classified as non-significant. Results are categorized as positive when they are in line with TMT reasoning and negative if they oppose TMT reasoning (as described in our categorization), while they are described as mixed when studies report significant effects for one or more DVs, while for other DVs no effect was found.

3.1 | Category One: I Want More Responses

Studies in this category all focus on attitudes and purchase intentions of specific (status) products, materialistic attitudes, and spending and love for money in general. We identified 63 experiments (in 43 papers) that examined MS effects on “I want more” consumer responses. Because this is a rather broad category, we additionally distinguished four subcategories: greed and materialistic tendencies ($n=19$), the appeal of advertisements, brands, and products ($n=28$), luxury and status products ($n=11$), and money attitudes ($n=5$). In line with TMT reasoning, it is expected that for all subcategories, MS impacts participants to want more. For an overview of included dependent variables, moderators, and outcomes, see Table 1.

3.2 | Greed and Materialistic Tendencies

Studies in this subcategory examined whether MS increases the value people place on material worth (nineteen studies in thirteen papers). Eight studies hypothesized main effects of MS and investigated interaction effects between MS and various moderators. Kasser and Sheldon (2000, Studies 1 and 2) predicted that after a MS manipulation, participants become more focused on the accumulation of wealth and possessions and that this effect is moderated by people's extrinsic goal orientation. In study 1, participants listed their financial expectations in 15 years, over different categories. Results showed a main effect for “pleasure spending,” but no significant effects for “overall worth” and “possessions.” No interaction effect with goal orientation was found. This study was replicated by Johnson et al. (2005), with the addition of the trait ‘hypomanic vulnerability’ as a potential moderator. Results yielded neither main effects on financial expectations, nor an interaction with goal orientation. However,

results did show an interaction effect between MS and hypomanic vulnerability; for high hypomanic-vulnerable participants, MS resulted in higher financial expectations, while for low hypomanic-vulnerable participants, MS led to lower financial expectations. In Kasser and Sheldon's second study (2000, Study 2), greed was measured by exposing participants to a fictitious scenario in which they had to bid against competitors to harvest timber, they then had to rate how many acres they would harvest, and how much they would like to profit more than their competitors. Results showed main effects for both DVs; MS participants preferred to harvest more acres and make more profit compared to participants in the control condition. Again, no interaction effect was found for extrinsic value orientation. This study was replicated by Todorova (2020) among Bulgarian students, but no MS effect on either dependent variable was found. Another replication was conducted by Fritsche et al. (2010, Study 2), they incorporated a self-interest (vs. a common interest) norm prime as moderator and included three bidding scenarios instead of one. Mixed results were found; for bid 1, a main effect was found: MS led participants to cut fewer acres compared to the control group; for bid 2, no effect was found; for bid 3, only a MS by norm prime interaction was found: after a MS and a common norm prime, participants cut fewer acres compared to MS participants after a self-interest prime. There were no effects regarding participants' preference for profit.

In a different study, Allen and Wilson (2005, Study 3) hypothesized that MS would increase participants' endorsement of materialism. Results yielded no main effect, but an interaction effect between MS and a sense of security, indicating that participants who were exposed to MS and felt insecure (vs. secure) supported materialism more compared to those in the control condition. Likewise, Hussein et al. (2018) expected MS to lead to more pro-materialistic consumption and had participants choose between a pro- and non-materialistic version of an apartment, a car, and an outing. Results showed a main effect: MS participants made more pro-materialistic choices compared to participants in the control condition. In a follow-up study, Akil et al. (2018) anticipated MS to lead to pro-materialistic (vs. pro-environmental) product selection and expected interaction effects between MS and materialistic values and environmental self-esteem. Results revealed a main effect; MS led to more pro-materialistic choices compared to the control condition. Moreover, the expected interaction effects were found, MS participants with high (compared to low) materialistic values more often selected pro-materialistic products, and MS participants with high (compared to low) environmental self-esteem more often selected the pro-environmental products.

Three studies formulated no main effects. Chen et al. (2019, Study 1) hypothesized an interaction effect between MS and a karma prime on excessive consumption. Results showed no main effect, but the expected interaction effect was found; when exposed to an MS and a karma-absent prime, participants had a higher desirability for excessive consumption. When karma presence was primed, there was no difference between MS and control. Furthermore, Shrivastava et al. (2017) formulated no clear expectations but merely investigated the effect of MS on self-reported materialism. They applied a within design, where each participant was exposed to one (counterbalanced) condition (MS vs. control vs. spirituality), on the same day of the week, for

TABLE 1 | Summary of findings for “I want more” responses.

Category	N studies	Included dependent variables	Findings main effects of MS	Findings moderating variables
Greed and materialistic tendencies	19	Appeal of environmental consumption, consumption resistance, excessive consumption, financial expectations, greed, materialism, product choice, save or spend scenarios, willingness to pay, yearly bids.	Five studies found MS to result in more greed and materialism (of those, one found mixed results). Five studies found MS to result in less materialism (of those, one found mixed results) Nine studies found no main effect in either direction.	MS effects were stronger for individuals that are hypomanic vulnerable, materialistic, have low environmental self-esteem and a low sense of security, when there is no meaning fulfillment, or when karma is not present. There were mixed results for norm primes: a common (vs. self-interest) norm prime may or may not lead to stronger MS effects. MS effects were not influenced by extrinsic values, self-esteem, voluntary simplicity, or frugality.
The appeal of advertisements, brands, and products	28	Advertisement attitude, advertisement recall, brand attitude, brand connection, brand loyalty, product attitude, product need, product preference, product selection, purchase intention, spending intention, willingness to pay.	Eleven studies found main effects (of which three mixed), three studies found opposing main effects and 14 studies found no main effects.	MS effects were stronger for males, Asians, individuals with low self-esteem and high materialistic values, but also for emotional appeals, moral beauty advertisements, after a door-in-the-face technique, or a pro-environmental norm-prime. MS effects were weaker for females, Americans, individuals with a relativist worldview, and after a nostalgia prime. Three-way interaction effects were found between MS, self-esteem and self-awareness, and MS, advertisements with moral beauty and participant age. Mixed three-way interaction effects between MS, sexualized content and gender, and between MS, country and religious commitment. Expected interaction effects that did not occur, were between MS and self-esteem, brand familiarity, product-specific self-esteem, and utilitarian products.
Luxury and status products	11	Brand attitude, product attitude, product preference, reaction time, willingness to pay.	Six studies found main effects of MS for high-status products. Five studies found no main effects.	The negative MS effect on low-status product appreciation is stronger after a social presence prime and for non-materialistic participants. The positive MS effect on high-status products is stronger after a social presence prime, but weaker when an individual grows older or when (elderly) individuals feel younger. No interaction effects were found between MS and self-esteem and attitude toward luxury.
Money attitudes	5	Desire for money, love for money, money size.	Three studies found that MS led to an increased valuation of money. One study found MS led to a decreased desire for money. One study found mixed results.	In one study MS effects only occurred for individuals that have a symbolic attitude toward money and in one study for individuals that score low on spirituality.

three consecutive weeks. Results yielded no significant effects of MS. Finally, Wang (2015, Study 2) investigated MS effects on the preference for materialistic versus experience-related products by having participants choose between two products, but no MS effect was found.

Interestingly, another eight studies hypothesized MS to result in less greed and materialistic tendencies. Zaleskiewicz et al. (2013b, Studies 2–) postulated that MS would result in preferring frugal behavior over spending behavior. In each study, participants read different scenarios and had to make choices that represented either frugal, saving, or spendthrift behavior. Results of Study 2 revealed a main effect for one of the two scenarios. The results of Studies 3 and 4 yielded a main effect: MS led participants to save more money, compared to the control condition. Nepomuceno and Laroche (2016, Studies 1 and 2) hypothesized that individuals who already voluntarily resist consumption can resist consumption after being exposed to MS. Three moderators were measured: self-esteem (Study 2 only), frugality, and voluntary simplicity, after which participants indicated their propensity to resist consumption and save money. Results revealed no significant effects. Finally, Shim and White (2017, Studies 2–4) predicted MS to increase preference for experiential over materialistic purchases (Studies 2–4), but that this effect would be weaker after a meaning fulfillment manipulation (Study 4). Results showed main effects: MS increased willingness to pay for experiential products (Studies 2 and 3), and an interaction effect between MS and meaning fulfillment (Study 4): MS increased willingness to pay for experiential products, compared to control products, but only in the no meaning fulfillment condition.

3.3 | The Appeal of Advertisements, Brands, and Products

In this subcategory, studies are discussed that examined consumer responses related to the evaluation of specific consumption expressions. Eleven studies expected main effects and (sometimes) interaction effects. Dar-Nimrod (2012, Study 2) predicted that exposure to MS videos would increase the desire for various advertised products (e.g., computers, jeans, coffee, and shampoo). Results showed a main effect; when mortality was salient, participants evaluated the advertised products as more appealing compared to the control condition. Fransen et al. (2011, Study 1) predicted that MS would increase the favorable evaluation of a luxury car and that this effect would be stronger under conditions of social presence. Results revealed no main effect, but the expected interaction was observed: MS resulted in a more positive product attitude, but only when participants knew that others could observe their behavior. Similarly, in three studies by Das et al. (2014), it was hypothesized that MS-inducing advertisements result in more positive attitudes toward the advertisement and increased spending intentions (Studies 1–3) and that the effect would be stronger for familiar products (Study 2) and for products that provide consumers with a source of self-esteem (Study 3). Results showed positive main effects; after a MS prime, participants displayed a higher purchase intention (Studies 1–3) and had a more positive attitude toward the advertisement (Studies 1 and 2). No interaction effects were found between MS and brand familiarity (Study 2) and product-related

self-esteem (Study 3). Likewise, Van Bommel et al. (2015) expected MS to increase the appeal of conspicuous and familiar brands. Results showed a main effect; MS resulted in an overall decreased liking of the brands. Looking at specific product types, however, MS (vs. control) led participants to prefer familiar brands and conspicuous brands, but no effect was found for the third category, unfamiliar extensions of a familiar brand. Fransen et al. (2008, Study 1) expected MS to increase spending intentions for food and entertainment. Results revealed a main effect: MS-primed participants intended to spend more money compared to the control group.

Finally, in four studies, Mandel and Smeesters (2008, Pilot, Studies 1, 2, and 4) predicted MS would lead participants to purchase more food products, with stronger effects for low self-esteem participants (Studies 1, 2, and 4), and weaker effects when self-awareness with no escape (vs. no self-awareness and self-awareness with escape) was primed (Study 4). In all studies, participants were asked to select food and drink items that they would like to purchase. Additionally, in Study 4, participants were placed in either a ‘self-awareness no-escape’ condition, a ‘self-awareness escape’ condition, or ‘no self-awareness’ condition. Results showed main effects (pilot, Studies 1 and 2), where MS participants selected more food products compared to the control condition. An interaction effect between MS and self-esteem was also found (Studies 1 and 2); the MS effect only occurred for low self-esteem participants and not for high self-esteem participants. Study 4 yielded no main or interaction effect with self-esteem; however, a three-way interaction was observed between MS, self-esteem, and self-awareness: after MS, low self-esteem participants that were in the “self-awareness escape” and the “no self-awareness” condition, selected more items compared to low self-esteem participants in the control condition. In contrast, one study (Urien 2005) predicted a negative MS effect on people’s willingness to pay. People in the MS condition were expected to keep their money rather than spend more on environmentally friendly products and services; a gender difference was also expected. Results revealed no main effect, but an interaction effect between MS and gender was observed; in the MS condition, women were willing to pay less for environmentally friendly products and services, while men were prepared to pay more. There was no gender difference in the control condition.

Thirteen studies hypothesized positive MS effects on consumer responses to only occur under certain conditions. Kneer et al. (2011) hypothesized that MS would lead to stronger effects for positive emotional (vs. informational) advertisements on ad recall, commercial evaluation, product evaluation, and purchase intention. Results revealed a main effect for purchase intention and the expected interaction effects: under MS, the effects of emotional appeals lead to more positive commercial and product evaluations, higher recall, and greater purchase intention. Comparably, two studies by Wu (2019, Studies 1 and 2) predicted that MS would result in more favorable attitudes toward an advertisement that presents moral beauty (vs. an advertisement without moral beauty) and that this effect would only occur for younger participants (Study 2). Results for both studies revealed no main effect, but a significant interaction effect between MS and advertisement: participants in the MS condition had a more positive attitude toward the moral beauty ad (compared to the no moral beauty one), while in the control

condition, there was no difference between the ad attitudes. In addition, study 2 results revealed a three-way interaction effect between MS, advertisement, and participant age, showing that the previously reported interaction only occurred for the young age group (and not for older participants). Comparably, two studies (Lee et al. 2017, Studies 1 and 2) hypothesized that after an MS manipulation, men (vs. women) would have more negative product attitudes and lower purchase intentions when seeing advertisements that utilize female sex appeal (vs. neutral advertisements). Results revealed negative main effects on product attitude and purchase intention (Study 1, but not Study 2). Furthermore, significant three-way interaction effects were found between MS, advertisement, and gender: after MS, male participants had a more negative product attitude (Studies 1 and 2) and lower purchase intention (Study 1) for the sexualized advertised products compared to those in the control condition; there was no difference for women. Three studies by Minton et al. (2021, Studies 1–3) predicted that MS effects would be moderated by sample (American vs. Asian; Studies 1–3) and religious commitment (measured in Study 2 and manipulated in Study 3) on product attitudes and purchase intentions (Studies 1–3) and perceived product need (Study 3). Participants were shown advertisements containing a death prime for various products (life insurance, stop smoking, organ donation; dog adoption and medical gloves). No main effects were reported (Studies 1–3), but an interaction effect was found between MS and sample (Study 1). After MS, Asian participants had higher product attitudes and purchase intentions than American participants; no difference occurred in the control condition. Furthermore, two (of the expected five) three-way interaction effects were found between MS, religion, and sample: for less religiously committed Asian participants, MS resulted in higher purchase intentions (Study 2) and perceived product need (Study 3) compared to the control condition, while the opposite pattern of effects occurred for American participants.

Two studies by Magee and Kalyanaraman (2009, Studies 1 and 2) hypothesized that the more relativist one's worldview, the less favorable one's advertisement attitude, brand attitude, and purchase intention and that this effect would be stronger following MS (vs. control). Results revealed a negative main effect on brand attitude (Study 2), and (most of) the expected negative interaction effects between MS and worldview: for relativist world-view participants, MS led to a more negative advertisement attitude (Studies 1 and 2), brand attitude (Study 2), and purchase intention (Studies 1 and 2). Comparably, Rindfleisch et al. (2009, Study 2) predicted that only for materialistic participants, MS would have a positive effect on brand connections and brand loyalty toward their preferred brand of mp3 player and sunglasses. Results showed a positive main effect for one of the two products (the mp3 player) on brand connections. Next to that, the expected interaction effect between MS and materialism was found for both products: under MS, materialistic participants formed stronger brand connections than low-materialistic participants, while there was no difference in the control condition. No effects were found for brand loyalty. Furthermore, Schindler and Reinhard (2015, Study 1) hypothesized that MS combined with a “door in the face” request (vs. critical request) would increase the purchase intention of a newspaper subscription. Results revealed no main effect, but an interaction effect between MS and request type; only in the door-in-the-face

condition MS led to a higher purchase intention compared to control. Fritsche et al. (2010, Study 1) predicted MS would lead to pro-environmental product preference (a hybrid car vs. a Range Rover) after a pro-environmental (vs. anti-environmental) norm prime. Results revealed no main effect, but a three-way interaction effect between MS, norm salience, and product type: MS increased the appeal of the pro-environmental product in the pro- but not in the anti-environment norm condition.

Finally, one study (Wang and Chao 2019, Study 3) hypothesized that MS would enhance the negative effect of a nostalgia prime on green consumption. Results showed an interaction effect between MS and nostalgia for the green product: in the nostalgia (vs. neutral) condition MS resulted in a lower purchase likelihood compared to control. Lastly, two studies had no explicit expectation of MS, because they focused on a third condition. Wang (2015, Study 4) examined the difference between MS and control, and MSLO (mortality salience of a loved one) on the choice of materialistic versus non-materialistic products (respectively the magazines “Money” and “Canadian Family”). No effect of MS was observed. Xu and Leung (2020, Study 1) hypothesized that afterlife salience (vs. mortality salience and control) participants were willing to pay a higher price, only for utilitarian (and not hedonistic) products. Results revealed no MS main or interaction effects.

3.4 | Product Status (High Versus Low Status)

This subcategory entails responses related to specific products that represent status or luxury. Eleven studies (in nine papers) focused on “luxury versus non-luxury” ($n=6$) and “high versus low status” ($n=5$) products, all using the high versus low status variable as a within factor.

Just one study (Fransen et al. 2011, Study 2) expected that MS would lead to more positive luxury brand evaluations, but also more negative non-luxury brand evaluations and that this effect would be stronger under the condition of social presence. Results revealed just a significant interaction effect between MS and social presence: only in the social presence condition MS resulted in more positive luxury brand evaluations and more negative for non-luxury brand evaluations.

Eight studies hypothesized MS effects to occur only for luxury products, while no effect was expected for non-luxury products. Results of Chopik and Edelstein (2014, Studies 3 and 4) revealed that for luxury products MS-induced participants were willing to pay more, and Mandel and Heine (1999) showed that MS increased product evaluations for the luxury product. Heine et al. (2002) predicted that MS would lead Japanese consumers to prefer high-status over low-status products (a car and a snack). Results revealed no significant main effect for MS. Walczak et al. (2018) hypothesized MS would increase the appeal of exclusive (more expensive) products, but results revealed no MS effect. Audrin et al. (2018) expected the MS effect for luxury items to be stronger for materialistic participants. Their results revealed no main effect, but an interaction effect between MS and materialism: under MS, low materialistic participants were less attracted to luxury items (compared to the control condition). No effect was found for materialistic participants. Rezaee

Vessal and Partouche-Sebban (2022, Studies 1 and 2) expected MS to lead to increased status consumption among elderly participants and that the effect was moderated by objective and subjective age (Study 2 only). Furthermore, self-esteem and attitude toward luxury brands were measured. Participants were all over 50 and had to choose between pairs of products that included a luxury and a non-luxury option. Results indicated a main effect: MS led to an increased preference for luxury products compared to the control group (Studies 1 and 2) and interaction effects between MS and objective and subjective age. When an individual grows older, the effect of MS on luxury product preference decreased, while for elderly individuals who felt younger, MS resulted in lower preferences for luxury consumption. No effects of self-esteem and attitude toward luxury were reported.

Two studies formulated no clear expectations. Wang (2015, Study 1) investigated the difference between MS, control, and MSLO and focused on luxury (vs. non-luxury) product evaluation. Results revealed a main effect of MS: after a MS manipulation, participants had more positive product evaluations; there was no difference for the non-luxury items. A study by Dar-Nimrod (2012, Study 1) also listed no clear expectation of MS on product appeal for high- and low-status products. A main effect of MS was reported: MS participants reported increased product liking, but no distinction was made between high and low-status products; we assume no difference for status was found.

3.5 | Money Attitudes

Central to this subcategory is the reasoning that MS can affect the way people feel about money itself, specifically that MS leads to an increased appreciation of money. This subcategory entails five studies (in three papers).

Zaleskiewicz et al. (2013a, Studies 1–3) hypothesized MS would prompt participants to attribute a higher value to money, by an overestimation of money size (Study 1), having higher criteria for richness (Study 2), and the desire for higher compensation for waiving their immediate payment (Study 3). In addition, they expected that MS effects would be stronger for people with symbolic (rather than instrumental) attitudes toward money (Studies 2 and 3). Results yielded main effects in all three studies, showing that MS increased participants' love for money. Furthermore, interaction effects between MS and money attitudes were found in both studies: MS effects were present for participants with a symbolic attitude toward money, but non-existent for instrumental money attitude participants.

In contrast to Zaleskiewicz and colleagues' expectations, Dong et al. (2019, Study 1) anticipated MS to reduce love for money and a weaker effect for high (vs. low) spirituality participants. Results showed the expected main and interaction effect: MS participants reported a lower love for money, and this effect only occurred among participants who score low on spirituality, and not for high spirituality individuals. Finally, Wang (2015, Study 3) had no clear expectation of MS but merely investigated the difference between MS, control, and MSLO effects on participants' desire for money. Desire for money was measured in two ways, by (1) estimating coin size, and (2) the question of how many of eight pleasant things (e.g., sunshine, spring, chocolate)

participants would be willing to forego permanently in exchange for 2 million dollars. Results revealed a positive MS main effect on the estimation of coins, but no effect was found on the second variable.

3.6 | Category 2: Protect My Culture Responses

Studies ($n=29$, in 17 papers) in this category all focus on responses related to the protection of one's cultural worldview. We distinguish two subcategories: In/out-group attitudes and behaviors ($n=19$ studies) and nostalgia and product age ($n=10$ studies). For an overview of included dependent variables, moderators, and outcomes, see Table 2.

3.7 | In/Out-Group Attitudes, Intentions, and Behaviors

This category is based on the assumption that MS leads to an increased preference for what is domestic (or local) and a decreased preference for what is foreign. However, between the 19 included studies (in 14 papers), hypothesized MS effects differed greatly. Out of the 19 studies, 11 used product origin as a within factor, five studies used it as a between factor, and three included only one factor (a foreign product).

Fransen et al. (2008, Study 3) hypothesized MS would lead to both an increased appreciation for national products and a decreased appreciation of foreign ones. Results revealed simple main effects for both products: MS (compared to control) led to more positive attitudes toward domestic food products and more negative attitudes toward foreign food products. Similarly, Jonas et al. (2005) hypothesized that MS would lead to an increased valuation of a national currency (the German Mark) and a devaluation of a European currency (Studies 1 and 2), and a preference for German over foreign cars (Study 2). Results of both Studies 1 and 2 revealed a main effect on currency valuation: MS decreased the valuation of the Euro, but no effect was found for the German Mark. Furthermore, Study 2 results also revealed a main effect on car preference: MS increased the likelihood of buying German cars over foreign ones compared to control. Likewise, Marchlewski (2006, Studies 6 and 8) proposed MS would lead to a more positive evaluation of a local beer and a more negative one of a beer from a rival city. Study 6 revealed no main or interaction effect, but in study 8 the expected interaction was found: MS lowered the evaluation of the rival beer but did not increase the evaluation of the local beer.

Friese and Hofmann (2008, Studies 1 and 2) predicted a positive MS effect on the evaluation and consumption of domestic food products (soda drink and chocolate), but no prediction was made regarding foreign products. Results in both studies revealed no MS effects on either product attitude or consumption of domestic or foreign products. Rangan et al. (2015, Studies 2 and 4) proposed that MS would lead to a lower evaluation of a foreign advertisement compared to a domestic one, but only when there is enough delay between MS and the ads. Results of both studies showed no main effect, but an interaction effect between MS and delay was found: MS (vs. control) led to more favorable domestic advertisement attitudes over foreign ones,

TABLE 2 | Summary of findings for “protect my culture” responses.

Category	N studies	Included dependent variables	Findings main effects of MS	Findings moderating variables
In/out-group attitudes, intentions, and behaviors	19	Advertisement attitude, brand attitude, monetary donation, price acceptance, product attitude, product choice, purchase intention, putting an amount of money in an envelope	Eight studies found main effects, of which one study found both a positive domestic and negative foreign effect, six studies found either an effect on domestic or foreign products and one study found a negative MS effect on a domestic product. Eleven studies found no main effects.	Positive MS effects on foreign products are stronger after a world view prime, after a norm prime, and for old people. Negative MS effects on domestic products are stronger for young people. Two confirmed interaction effects were not fully clear: between MS and ‘self-identification with global consumer culture’, and between MS and a delay. The MS and age interaction yielded mixed results. MS effects were not influenced by hope and money attitudes.
Product age and nostalgia	10	Product evaluation, product preference, purchase intention, willingness to pay	Two studies found a main effect on increased product liking, regardless of product age. Five studies found a negative effect on new products. Three studies reported a positive effect on old products. One study found mixed results.	No moderators, other than product age, were included.

only when there was enough delay between MS and the advertisements and not when MS was followed by the advertisements directly. Zu et al. (2021, Study 2) predicted MS would lead to increased purchase intentions for products in general, but specifically for domestic (vs. imported) products. This was tested with a pre-test/post-test method for three different product types (normal vs. innovative vs. renovative, as a within factor). No main effects were reported, but separate 2×2 analyses revealed the expected interaction between MS and origin for two out of the three product types: after MS, purchase intentions of domestic innovative and renovative products increased. In contrast, Banerjee et al. (2019) hypothesized MS to lead to more positive attitudes toward a foreign (American) ice cream brand than toward a domestic (Indian) one. Results confirmed this expected MS main effect.

Sullivan et al. (2011) predicted a positive interaction effect between MS and a worldview affirmation prime on willingness to pay for foreign products. Results showed no main effect, but the expected interaction effect was found: only within the worldview affirmation condition, MS (vs. control) led participants to accept higher prices for a foreign product (fair trade milk). No effect was found for the domestic product. Comparably, Okazaki et al. (2019) predicted MS would lead to lower purchase intentions of a global brand and an interaction effect between MS with hope and “self-identification with global consumer culture” (IDGCC). Results revealed only an interaction effect between MS and IDGCC, after MS (vs. control) participants were more likely to reaffirm values related to IDGCC and buy global brands.

Roberts and Maxfield (2019) examined MS effects on charity donations for different age groups and in/outgroup charities. Specifically, they predicted that MS among older adults would increase donations for a global (outgroup) charity, while for middle-aged and young adults it would increase local (ingroup) charities. Results revealed no main effect of MS, however, for the two different charities separate interaction effects between MS and age were found. For the local charity, MS led to decreased donations for young adults (but not for middle-aged and old adults), while for the global charity MS led to increased donations for old adults (but not for young and middle-aged adults). Likewise, Bruine de Bruin and Ulqinaku (2021) focused on MS effects on donations, with a distinction between age groups, a national versus international charity, and a charity focused on the future generation versus general beneficiaries. Results revealed a main effect: in the MS condition participants donated more to charities. No interaction effects were found between MS, age, or charity type. Also focusing on domestic versus foreign charity donations, Jonas et al. (2002, Study 2) formulated no clear expectations. Results showed a simple main effect: MS participants donated more money to a domestic charity, while for a foreign charity, there was no difference between MS and control. In a later study, Jonas et al. (2013, Studies 1, 2) predicted that MS would lead to decreased donations to foreign charities (Study 1), but that this effect would be eliminated when generosity norms were primed (Study 2) and that the MS effect would be stronger for people that find money important (Study 2). The results of both studies showed no main effect on foreign charity donations, but in study 2 a significant interaction effect between MS and norm prime was found: only after a norm prime

MS led to more donations to foreign charities. Finally, Cutright et al. (2011, Study 2) formulated no expectation of MS and focused on the moderating effect of the trait “confidence in the system.” A main effect was found: participants in the MS (vs. control) condition preferred domestic brands over foreign ones. No moderating effects occurred.

3.8 | Nostalgia and Product Age

In this category, it is assumed that MS leads to an increased preference for what is old(er). A total of 10 studies (in 5 papers) are included. Five studies used product age as a second between-subjects factor, two studies used it as a within factor and three studies investigated only one product (either old or new).

Marchlewski (2006, Studies 1–5) hypothesized that MS increases evaluations of nostalgic products and lowers evaluations of new products. Results of Study 1 showed that MS (vs. control) indeed led to a higher evaluation of a classic car, whereas the results of Study 2 revealed that MS (vs. control) led to a lower evaluation of a modern model. In Studies 3–5, an old and new car served as a between-participants second factor, with results revealing MS and product type interaction effects: either only driven by an increased liking of the classic car (Study 3) or only a decreased liking of the new car (Studies 4 and 5). Comparably, Sarial-Abi et al. (2017, Study 5) predicted that MS would increase the preference for vintage products and had female participants choose between pairs of vintage and modern products (bracelets, watches, shawls, or purses). A main effect was found: MS (vs. control) participants more often selected vintage over modern products. Likewise, McCabe et al. (2016) predicted that following MS, participants would evaluate objects presented as older more positively and would be willing to pay a higher price. Participants were shown mundane objects (e.g., a pen, watch, chair, or umbrella) that were either said to be new, 20 years old, or 100 years old. Results showed no main effects for both DVs, but a significant MS and product age interaction was found for product evaluation (and not for willingness to pay): MS led to a greater valuation of the 100-year products; no effect was found for the new and 20-year-old products.

Boeuf (2019, Studies 1 and 2) had a slightly different angle and hypothesized that MS would decrease attitudes (Studies 1 and 2) and purchase intention (Study 2) of innovative products (a phone in Study 1 and a robot in Study 2). Results of Study 1 revealed no main effect but did uncover an interaction effect between MS and innovativeness: MS participants had more negative attitudes toward the innovative phone, compared to the same phone but with a non-innovative description. Specifically, participants in both the MS and control conditions rated the innovative product higher than the non-innovative product, but the effect was smaller in the MS condition. Study 2 results yielded main effects: after an MS manipulation, participants had a more negative attitude toward an innovative robot and lower purchase intentions. Finally, Zu et al. (2021, Study 1) used a pre-test/post-test method to test the prediction that MS would lead to an increased purchase intention for products in general, but specifically for normal (vs. innovative and renovative) products. Results revealed a positive main

effect of MS on purchase intention, but no interaction effect was found.

3.9 | Category 3: Pro-Social Responses

These studies concern consumer responses not aimed at enriching oneself but sharing wealth with others. Twenty studies (in 11 papers) investigate MS effects on pro-social consumer responses, of which some focus on charity donations ($n = 16$), and sharing money ($n = 4$). Central to this subcategory is the idea that MS leads people to adhere to the cultural worldview of “doing the right thing,” thus the assumption is that MS leads to increased donations and sharing. For an overview of included dependent variables, moderators, and outcomes, see Table 3.

3.10 | Charity Donations

Sixteen studies (in nine papers) are included in this subcategory, all focusing on monetary or product donations to a variety of real and fictitious charities. One study (Fransen et al. 2008, Study 2) hypothesized a positive main effect on donation willingness. Results showed a main effect: MS (vs. control) resulted in a higher donation willingness. Similarly, Dong et al. (2019, Studies 2–4) predicted MS to increase money spending on pro-social (vs. pro-self) goals (Studies 2 and 4) and charity donations (Study 3), and that this effect would be stronger for (a) low (vs. high) spirituality participants (measured in Studies 2 and 3; primed in Study 4), and (b) when participants generosity was superior (vs. inferior) to others (Study 3). Results revealed no main effects (Studies 2–4), but an interaction effect was found between MS and spirituality (Studies 2 and 3): for low spirituality participants, MS led to increased prosocial spending and larger donation intentions, while there was no effect for high spirituality participants. Another study (Jin and Ryu 2021, Study 2) was conducted in the context of the COVID-19 pandemic and hypothesized MS to lead to greater monetary donation intentions and increased prosocial spending intention. The authors predicted moderating effects of (a) selfishness; (b) narcissism; (c) greed; (d) materialism; (e) status consumption tendency; and (f) system-justifying tendency. Results revealed the expected main effects: MS led to increased donations and more prosocial spending. Furthermore, results showed stronger MS effects for people who are more selfish, narcissistic, greedy, materialistic, have a higher status consumption tendency (on increased donations and prosocial spending), and have a higher system-justifying tendency (on increased donations).

Five studies anticipated MS interaction (but no main) effects, with a variety of moderators. Ferraro et al. (2005, Study 3) expected that participants who derive self-esteem from virtue would donate more after MS, while low virtue participants would donate less after MS. Results showed the expected interaction effect: for participants that scored high on virtue as a source of self-esteem, MS led to higher charity donations, while for participants that scored low on virtue as a source of self-esteem, MS resulted in lower charity donations. Likewise, Davidson and Laroche (2018, Study 2) expected MS to lead to increased donation intentions after seeing an advertisement promoting human uniqueness (vs. human-animal sameness). Results showed no

TABLE 3 | Summary of findings for “prosocial” responses.

Category	N studies	Included dependent variables	Findings main effects of MS	Findings moderating variables
Charity donations	16	Donation behavior, donation intention of money, donation intention of possessions	Four studies found main effects. Twelve studies found no main effects.	MS effects were stronger for individuals that are greedier, more selfish, more narcissistic, more materialistic, value status consumption, are more system-justifying, score low on spirituality and high on virtue as a source of self-esteem, when donation can evoke transcendence, for environmental charities, after messages that contain a bandwagon appeal, and after a ‘humans are unique’ prime. MS effects were not influenced by trait self-esteem, a spirituality prime, a superiority prime, a “door in the face technique,” or the type of charity (environmental vs. cultural).
Sharing	4	Sharing behavior	Two studies found main effects. Two studies found no main effects.	MS effects were stronger after a fairness prime. MS effects were not influenced by a pro-social or pro-selfish incentive structure.

main effect, but a significant interaction effect between MS and human prime; after a MS and human uniqueness prime, scores on advertisement attitudes were higher (the interaction was not further explained by the authors). Two studies from Cai and Wyer (2015, Studies 1 and 2) expected MS to increase the effect of a bandwagon appeal on donation decisions. Participants read a bandwagon (i.e., many donations already have been made) or need-focused (i.e., the donated money so far is not enough) appeal to donate money to rebuild a Japanese school campus that was destroyed by an earthquake. Participants had to indicate whether they would like to donate money to the cause, yes or no (Study 1), and put an amount of money in an envelope (Study 2). In both studies, results showed no main effect, but interaction effects between MS and type of appeal were found: following MS and a bandwagon appeal, donations increased, there was no difference for the need-focused appeal. Also focusing on appeals, Schindler and Reinhard (2015, Study 2) hypothesized that a ‘door in the face’ request combined with MS should increase donations. Participants were exposed to either a ‘door in the face’ technique (by first being asked to mentor a child as part of the program and, if they refused, for a donation of at least €0.50) or a ‘critical request’ (by only being asked for the donation of at least €0.50). Results revealed no main effect, nor a significant interaction effect.

Dunn et al. (2020, Studies 1, 4, and 5) predicted MS to increase donation intention of possessions, but only when self-transcendence was possible (measured or primed in different ways across studies). Trait self-esteem was included as a moderator in Study 5. Only the results of Study 5 (and not 1 and 4) revealed a main effect, showing MS (vs. control) led to an increased donation intention. Furthermore, the expected interaction effect between MS and transcendence was found in Studies 1 and 5: MS (vs. control) increased donation intentions in the transcendence condition, but not in the non-transcendence condition; while Study 4 showed that when self-transcendence was achieved in another way (by joining an immortal group), MS

led to decreased donation intentions. Furthermore, no moderating effect of self-esteem (Study 5) was found. Finally, Fa and Kugihara (2020, Studies 1-3) hypothesized that after MS, East-Asian participants would be willing to donate more to a cause aimed at preservation in the future (compared to the present; Studies 1–3) and that the effect would be stronger for environmental charities (compared to cultural charities; Studies 2 and 3). Results revealed a main effect only in Study 1 (not in Studies 2 and 3), showing that participants were willing to donate more compared to control. Furthermore, Study 2 showed an interaction effect between MS and charity type: only in the environmental (vs. cultural) condition MS increased donations. Last, Study 3 revealed a three-way interaction between MS, time, and charity type; simple effects revealed that MS increased donation willingness for a cultural charity compared to control, regardless of preservation time. No other MS interaction effects were found.

3.11 | Sharing Behavior

In this subcategory, focusing on MS effects on people sharing more money with others, four studies are included. Zaleskiewicz et al. (2015, Studies 1–3) predicted MS to lead to a more generous allocation of financial resources. In all three studies, participants played a dictator game and were asked to divide the money between themselves and another player. Results of studies 1 and 2 revealed a main effect: MS participants shared more with others, compared to those in the control condition. In the third study, participants were either primed with a pro-social or pro-selfish incentive structure and then divided 10 tokens between themselves and the student government. Study 3 results revealed no main effect, nor an interaction effect. Similarly, Jonas et al. (2013, Study 3) predicted a positive interaction between MS and a fairness norm prime on generosity. Participants were told that they could anonymously divide \$10 between themselves and another participant. Results revealed no main effect, but an

interaction effect was observed: only after a fairness prime (vs. a neutral prime) MS led participants to give more to the other.

For an overview of all included studies, their characteristics, and main findings, see Table 4.

3.12 | General Summary Systematic Review

A total of 112 studies were discussed. A noticeable difference between studies is that 63% ($n = 71$) of the studies expected main effects, while the rest did not (37%, $n = 41$). Out of the studies that predicted main effects, 66% ($n = 47$) of the studies found significant main effects (of which five have mixed and seven have results contradicting TMT), while 34% ($n = 24$) of the studies did not find the expected main effects. Of the 41 studies that did not expect main effects, 27% ($n = 11$) found them (of which three mixed and three with opposing results) and 73% ($n = 30$) did not find main effects. In total, out of the 112 studies, 52% of the studies found main effects ($n = 58$, of which 5 with mixed results and 10 had results contradicting TMT), while 47% ($n = 54$) found no main effects. Results are mixed and authors' expectations seem to play a role. To illustrate this: Fransen et al. (2011, Study 1) hypothesized and found MS to lead to an increased evaluation of a Mercedes car, under the condition of social presence, because it was luxurious. In contrast, Marchlewski (2007, Study 5) hypothesized and found MS (compared to control) to lead to a decreased evaluation of a Mercedes car, because it was new (while MS led to increased evaluations of an old Mercedes). These are two studies, with an almost identical product and outcome variable, but following different reasoning and resulting in opposing outcomes.

The results also reveal a great variation in the investigated dependent variables. To illustrate this, approximately half of the DVs involved some type of consumer attitude measure. This, however, included attitudes toward advertisements, attitudes toward brands and brand connections, attitudes toward products, product preference, product valuation, and materialism (and comparable constructs) in general. These various DVs were measured in several ways, including 5–100 point Likert scales, 5–9 point semantic differentials, dichotomous choices, open-ended questions, and reaction times. Due to all these variations, even within the subcategories, it is difficult to conclude based on this systematic review how MS impacts consumer attitudes.

Regarding the investigated moderators, it is comparably difficult to see a pattern in the MS-driven interaction effects. Not only is the use of moderating variables very dispersed but the findings are also inconsistent. A total of 52 different moderating variables (either in the form of trait variables, message characteristics, or primes) were investigated. However, very few moderators ($n = 5$; self-esteem, materialism, money attitudes, age, gender) were included in more than one paper, and even then, findings were inconsistent. To illustrate this, trait self-esteem was measured as a moderator in seven studies (in four papers), of which two studies (Mandel and Smeesters 2008, Studies 1 and 2) found that MS effects were stronger for low-self-esteem participants, and five studies (Dunn et al. 2020, Study 5; Mandel and Smeesters 2008, Study 4; Nepomuceno and Laroche 2016, Study 2; Rezaee Vessal and Partouche-Sebban 2022, Studies

1 and 2) found no interaction between MS and self-esteem. Additionally, three studies investigated the role of specific self-esteem (i.e., self-esteem derived from a certain belief) where one study found an interaction effect between MS and environmental self-esteem (Akil et al. 2018), another found an interaction effect between MS and virtue as a source of self-esteem (Ferraro et al. 2005, Study 3), and the third study (Das et al. 2014, Study 3) found no MS interaction with product-specific self-esteem. It is remarkable that self-esteem is so scarcely included, as it is a fundamental concept within TMT and it is generally believed that higher self-esteem individuals are less susceptible to MS-invoked responses (Schimmel et al. 2019). Because moderators have not been systematically included in the reviewed studies, moderators cannot be included in the meta-analysis. Instead, the meta-analysis will focus on the strength of the overall effects and the effects in the (sub)categories, as formulated in RQ 2a and 2b.

3.13 | Meta-Analysis

The results showed a small but positive effect (i.e., in line with the MS hypothesis) of MS on consumer responses when all types of responses are included: $g = 0.21$, 95% CI [0.14, 0.28], $p < 0.001$. As expected, however, the effect sizes were not homogenous ($Q(124) = 462.58$, $p < 0.001$). 23.55% of the overall variances were attributed to sampling variance of the effect sizes themselves (level 1), 44.01% to within-study variance (i.e., between DVs; level 2), and 32.44% to between-study variance (level 3). Based on these outcomes we decided to also conduct separate analyses for each DV category. The results were similar across DV categories (see Figure 2 and for an overview of all effect estimates per included study, see Appendix C: Figures C1–C3). We found a small but positive effect of MS on both “I want more” responses ($g = 0.13$, 95% CI [0.01, 0.24], $p = 0.03$) and “pro-social” responses ($g = 0.22$, 95% CI [0.13, 0.31], $p < 0.001$). The positive effect of MS on “protect my culture” responses was small to medium in size ($g = 0.29$, 95% CI [0.19, 0.40], $p < 0.001$). The analyses thus suggest that previous consumer research supports the MS hypothesis.

In addition, we tested whether results were similar across the subcategories of the DV types. Heterogeneity tests were first conducted to test whether it made sense to conduct further analyses with subcategory as a moderator. The effect sizes were indeed heterogeneous in the case of “I want more” ($Q(55) = 223.67$, $p < 0.001$) and “protect my culture” responses ($Q(51) = 207.91$, $p < 0.001$). They were in fact homogenous in the case of the Pro-social responses ($Q(16) = 24.64$, $p = 0.08$), which is why moderator analyses were only conducted for the first two DV categories.

The results showed that subcategory was a significant moderator for MS effects on “I want more” responses ($F(3, 52) = 3.11$, $p = 0.03$). Effect estimates for “luxury and status products” ($g = 0.28$) were significantly larger than those for “greed and materialistic tendencies,” for which a negative effect was found ($g = -0.12$, $t = 2.36$, $p = 0.02$). Effect estimates for “money attitudes” ($g = 0.36$) were also larger than those for “greed and materialistic tendencies” ($t = 2.69$, $p = 0.001$). No other significant differences between “I want more” subcategories were found, including involving “appeal of advertisements, brands and

TABLE 4 | Overview table of all included studies, their characteristics, and main findings.

ID	Authors, year, study #	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)	Included in meta-analysis
	I want more responses							
	Greed and materialistic tendencies							
1	Akil et al. (2018)	132	Applied	Neutral	Pro-materialistic (vs. pro-environmental) product selection	Materialistic values; environmental self-esteem	Positive main effect; interactions with materialistic values and environmental self-esteem	No ^a
2	Allen and Wilson (2005), study 3	124	Writing	None	Endorsement of materialism	Sense of security	No main effect; interaction with sense of security	No ^a
3	Chen et al. (2019), study 1	132	Writing	Aversive	Excessive consumption	Karma	No main effect; positive interaction with excessive consumption	Yes
4	Fritsche et al. (2010), study 2	101	Other	Aversive	No. of acres harvested (3 bids); desired profit	Norm (self vs. common interest)	Mixed main effect; no interaction	Yes
5	Hussein et al. (2018)	160	Applied	Neutral	Product preference		Positive main effect	No ^a
6	Johnson et al. (2005)	225	Writing	Neutral	Financial expectations	Goal orientation; hypomanic vulnerability	No main effect; interaction with hypomanic vulnerability	Yes
7	Kasser and Sheldon (2000), study 1	60	Writing	Neutral	Financial expectations	Goal orientation	Mixed main effect; no interaction	Yes
8	Kasser and Sheldon (2000), study 2	73	Writing	Neutral	No. of acres harvested; desired profit	Goal orientation	Positive main effect for bid and desired profit	Yes
9	Nepomuceno and Laroche (2016), study 1	213	Writing	Aversive	Resist consumption	Frugality; voluntary simplicity	No main effect; no interactions	No ^a

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
10	Nepomuceno and Laroche (2016), study 2	No ^a	290	Writing	Aversive	Resist consumption	Self-esteem; frugality; voluntary simplicity	No main effect; no interactions
11	Shim and White (2017), study 2	No ^a	392	Writing	Neutral	Willingness to pay (experiential vs. materialistic)		Negative main effect
12	Shim and White (2017), study 3	No ^a	158	Applied	Aversive	Willingness to pay (experiential vs. materialistic)		Negative main effect
13	Shim and White (2017), study 4	No ^a	228	Applied	Aversive	Willingness to pay (experiential vs. materialistic)	Meaning fulfillment	No main effect; interaction with meaning fulfillment
14	Shrivastava et al. (2017)	No ^c	60	Writing	Neutral	Materialism		No main effect
15	Todorova (2020)	Yes	36	Writing	Neutral	No. of acres harvested; desired profit		No main effects
16	Wang (2015), study 2	Yes	105	Writing	Aversive	Product choice (materialistic vs. experience-related)		No main effect
17	Zaleskiewicz et al. (2013b), study 2	Yes	92	Writing	Aversive	Spending behavior (frugality vs. spending)		Mixed main effect
18	Zaleskiewicz et al. (2013b), study 3	Yes	88	Writing	Aversive	Spending behavior (frugality vs. spending)		Negative main effect
19	Zaleskiewicz et al. (2013b), study 4	Yes	81	Writing	Aversive	Spending behavior (frugality vs. spending)		Negative main effect

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
The appeal of advertisements, brands and products								
20	Dar-Nimrod (2012), study 2	Yes	120	Applied	Aversive	Product appeal	Product-status	Positive main effect; no interaction
21	Das et al. (2014), study 1	Yes	95	Applied	Neutral	Advertisement attitude; spending intention		Positive main effects
22	Das et al. (2014), study 2	Yes	95	Applied	Neutral	Advertisement attitude; spending intention	Product familiarity	Positive main effects
23	Das et al. (2014), study 3	Yes	195	Applied	Neutral	Advertisement attitude; spending intention	Product specific self-esteem	Positive main effect for spending intention; no interaction
24	Fransen et al. (2008), study 1	Yes	43	Applied	None	Spending intention		Positive main effect
25	Fransen et al. (2011), study 1	Yes	111	Writing	Aversive	Product attitude	Social presence	No main effect; interaction with social presence
26	Fritsche et al. (2010), study 1	Yes	83	Writing	Aversive	Product appeal	Norms (pro- vs. anti-environmental); product type (pro- vs. anti-environmental)	No main effect; no interaction; three-way interaction with norms and product type
27	Kneer et al. (2011)	No ^a	52	Writing	Neutral	Ad recall; commercial evaluation; product purchase intention	Advertisement type (emotional vs. informational)	Positive main effect for purchase intention; interaction with ad type for commercial- and product evaluations, recall, and purchase intention

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
28	Lee et al. (2017), study 1	Yes	244	Applied	Aversive	Product attitude; purchase intention	Gender; sexualized advertisements	Negative main effect; three-way interaction with gender and sexualized ads on product attitude and purchase intention
29	Lee et al. (2017), study 2	No ^a	275	Applied	Neutral	Product attitude; purchase intention	Gender; sexualized content	Negative main effect; three-way interaction with gender and sexualized ads on product attitude
30	Magee and Kalyanaraman (2009), study 1	No ^a	149	Writing	Neutral	Advertisement attitude; brand attitude; purchase intention	Relativist worldview	No main effects; interaction with worldview on ad attitude and purchase intention
31	Magee and Kalyanaraman (2009), study 2	No ^a	151	Writing	Neutral	Advertisement attitude; brand attitude; purchase intention	Relativist worldview	Negative main effect on brand attitude; interaction with worldview on ad- and brand attitude, and purchase intention
32	Mandel and Smeesters (2008), pilot study	No ^a	32	Writing	Aversive	Purchase intention		Positive main effect
33	Mandel and Smeesters (2008), study 1	No ^a	392	Writing	Aversive	Purchase intention	Self-esteem	Positive main effect; interaction with self-esteem
34	Mandel and Smeesters (2008), study 2	No ^a	70	Writing	Aversive	Purchase intention	Self-esteem	Positive main effect; interaction with self-esteem

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
35	Mandel and Smeesters (2008), study 4	No ^a	149	Writing	Aversive	Purchase intention	Self-esteem; self-awareness	No main effect; no interactions; three-way interaction with self-esteem and self-awareness
36	Minton et al. (2021), study 1	Yes	292	Applied	Neutral	Product attitude; purchase intentions	Sample (American vs. Asian)	No main effects; interaction with sample for product attitude and purchase intentions
37	Minton et al. (2021), study 2	No ^a	191	Applied	Neutral	Product attitudes; purchase intentions	American vs. Asian sample; religious commitment	No main effects; no interaction; three-way interaction with sample and religious commitment for purchase intentions
38	Minton et al. (2021), study 3	Yes	371	Applied	Neutral	Product attitudes; purchase intentions; product need	American vs. Asian sample; religious commitment	No main effects; no interaction; three-way interaction with sample and religious commitment for product need
39	Rindfleisch et al. (2009), study 2	No ^a	125	Writing	Neutral	Brand connections; brand loyalty	Materialism	Mixed main effect for brand connection; interaction with materialism and brand connection
40	Schindler and Reinhard (2015), study 1	Yes	75	Writing	Aversive	Purchase intention	Request type (door in the face vs. critical)	No main effect; interaction with request type
41	Urien (2005)	Yes	130	Other	Neutral	Willingness to pay	Gender	No main effect; interaction with gender

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
42	Van Bommel et al. (2015)	Yes	33	Writing	Neutral	Brand appeal (conspicuous vs. familiar vs. unfamiliar extension)		Mixed main effects
43	Wang (2015), study 4	Yes	134	Writing	Aversive	Product choice (materialistic vs. non-materialistic)		No main effect
44	Wang and Chao (2019), study 3	No ^a	179	Writing	Aversive	Green consumption	Nostalgia	No main effect; interaction with nostalgia
45	Wu (2019), study 1	Yes	117	Writing	Aversive	Advertisement attitude	Moral beauty	No main effect; interaction with moral beauty
46	Wu (2019), study 2	Yes	229	Writing	Aversive	Advertisement attitude	Moral beauty; age	No main effect; interaction with moral beauty; three-way interaction with moral beauty and age
47	Xu and Leung (2020), study 1	Yes	125	Other	Neutral	Willingness to pay	Product type utilitarian (vs. hedonistic)	No main effect; no interaction
Product status								
48	Audrin et al. (2018)	Yes	85	Other	Neutral	Reaction time to luxury logo's	Materialism	No main effect; interaction with materialism
49	Chopik and Edelstein (2014), study 3	Yes	467	Applied	Neutral	Willingness to pay (luxury vs. non-luxury)		Positive main effect
50	Chopik and Edelstein (2014), study 4	Yes	521	Applied	Neutral	Willingness to pay (luxury vs. non-luxury)		Positive main effect

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
51	Dar-Nimrod (2012), study 1	Yes	107	Applied	Neutral	Product appeal		Positive main effect
52	Fransen et al. (2011), study 2	Yes	75	Writing	Aversive	Product attitude (luxury vs. non-luxury)	Social presence	No main effect; interaction with social presence
53	Heine et al. (2002)	Yes	60	Writing	Aversive	Product appeal (high vs. low status)		No main effect
54	Mandel and Heine (1999)	No ^a	74	Other	Aversive	Product evaluation (luxury vs. non-luxury)		Positive main effect
55	Rezaee Vessal and Partouche-Sebban (2022), study 1	No ^a	292	Writing	Aversive	Product choice (luxury vs. non luxury product)	Self-esteem; attitude toward luxury brands	Positive main effect; no interactions
56	Rezaee Vessal and Partouche-Sebban (2022), study 2	No ^a	285	Writing	Aversive	Product choice (luxury vs. non luxury product)	Self-esteem; attitude toward luxury brands; objective- and subjective age	Positive main effect; positive interactions with objective and subjective age
57	Walczak et al. (2018)	No ^b	84	Other	Neutral	Product appeal		No main effect
58	Wang (2015), study 1	Yes	81	Writing	Aversive	Product preference (luxury vs. non-luxury)		Positive main effect
Money attitudes								
59	Dong et al. (2019), study 1	Yes	131	Other	Aversive	Love for money	Spirituality	Negative main effect; interaction with spirituality
60	Wang (2015), study 3	Yes	233	Writing	Aversive	Estimating coin size; price to forgo experiences		Positive main effect on coin size estimation
61	Zaleskiewicz et al. (2013a), study 1	Yes	123	Other	Aversive	Estimating coin size		Positive main effect

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
62	Zaleskiewicz et al. (2013a), study 2	Yes	123	Other	Aversive	Criteria for richness	Money attitude (symbolic vs. instrumental)	Positive main effect; interaction with money attitude
63	Zaleskiewicz et al. (2013a), study 3	Yes	85	Other	Aversive	Desire for higher compensation	Money attitude (symbolic vs. instrumental)	Positive main effect; interaction with money attitude
Protect my culture responses								
In/out-group attitudes, intentions, and behaviors								
64	Banerjee et al. (2019)	No ^a	105	Writing	None	Brand attitude		Negative main effect
65	Bruine de Bruin and Ulqinaku (2021)	Yes	5376	Other	None	Donation behavior	Age; charity origin (domestic vs. foreign); charity type (future vs. general)	Positive main effect; no interactions
66	Cutright et al. (2011), study 2	Yes	81	Writing	Aversive	Brand preference	Confidence in the system	Positive main effect; no interaction
67	Fransen et al. (2008), study 3	Yes	77	Applied	None	Willingness to donate		Positive main effect
68	Friese and Hofmann (2008), study 1	Yes	69	Writing	Aversive	Product attitude; product consumption (foreign vs. domestic)		No main effect
69	Friese and Hofmann (2008), study 2	Yes	49	Writing	Aversive	Product attitude; product consumption (foreign vs. domestic)		No main effect
70	Jonas et al. (2002), study 2	Yes	22	Writing	Aversive	Charity donation (foreign vs. domestic)		Positive main effect

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
71	Jonas et al. (2005), study 1	Yes	60	Writing	Aversive	Product appeal (foreign vs. domestic)		Positive main effect
72	Jonas et al. (2005), study 2	Yes	100	Other	Neutral	Product appeal (foreign vs. domestic)		Positive main effect
73	Jonas et al. (2013), study 1	Yes	32	Writing	Aversive	Donation behavior		No main effect
74	Jonas et al. (2013), study 2	Yes	67	Writing	Aversive	Donation behavior	Generosity norm; money importance	No main effect; no interactions
75	Marchlewski (2006), study 6	Yes	57	Writing	Neutral	Product evaluation (local vs. foreign)		No main effect
76	Marchlewski (2006), study 8	Yes	192	Writing	Neutral	Product evaluation	Product origin (local vs. foreign)	No main effect; interaction with product origin
77	Okazaki et al. (2019)	Yes	720	Other	Aversive	Purchase intention	Hope; self-identification with global consumer culture	No main effect; interaction with IDGCC
78	Rangan et al. (2015), study 2	No ^a	300	Applied	Neutral	Advertisement attitude	Delay	No main effect; interaction with delay
79	Rangan et al. (2015), study 4	No ^a	230	Applied	Neutral	Advertisement attitude	Delay	No main effect; interaction with delay
80	Roberts and Maxfield (2019)	Yes	124	Writing	Aversive	Charity donation	Age; local (vs. global) charity	No main effect; interaction with age for global charity; interaction with age for local charity
81	Sullivan et al. (2011)	Yes	137	Writing	Aversive	Willingness to pay for foreign products	Worldview affirmation	No main effect; interaction with world view affirmation

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
82	Zu et al. (2021), study 2	Yes	82	Other	Neutral	Purchase intention	Product origin (domestic vs. imported); product type (normal vs. innovative vs. renovative)	No main effect; interaction with product origin and -type
Nostalgia and product age								
83	Boeuf (2019), study 1	Yes	195	Applied	Neutral	Product attitude	Product innovativeness	No main effect; positive interaction with product innovativeness
84	Boeuf (2019), study 2	Yes	103	Writing	Aversive	Product attitude; purchase intention		Positive main effect on product attitude and purchase intention
85	Marchlewski (2006), study 1	Yes	60	Writing	Neutral	Product evaluation		Positive main effect
86	Marchlewski (2006), study 2	Yes	60	Writing	Neutral	Product evaluation		Positive main effect
87	Marchlewski (2006), study 3	Yes	200	Other	Neutral	Product evaluation	Product type (nostalgic vs. new)	No main effect; interaction with product type
88	Marchlewski (2006), study 4	Yes	200	Other	Neutral	Product evaluation	Product type (nostalgic vs. new)	No main effect; interaction with product type
89	Marchlewski (2006), study 5	Yes	200	Other	Neutral	Product evaluation	Product type (nostalgic vs. new)	No main effect; interaction with product type
90	McCabe et al. (2016)	Yes	288	Writing	Aversive	Product evaluation; willingness to pay	Product age (new vs. 20-year-old vs. 100-year-old)	No main effects; interaction with product age for product evaluation
91	Sarial-Abi et al. (2017), study 5	Yes	173	Writing	Aversive	Product choice (vintage vs. new)		Positive main effect

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
92	Zu et al. (2021), study 1	Yes	41	Other	Neutral	Purchase intention	Product type (normal vs. innovative vs. renovative)	Positive main effect; no interaction
Pro-social responses								
Charity donations								
93	Cai and Wyer (2015), study 1	Yes	54	Writing	Aversive	Donation intention	Appeal type (bandwagon vs. need-focused)	No main effect; interaction with appeal
94	Cai and Wyer (2015), study 2	Yes	83	Writing	Aversive	Donation behavior	Appeal type (bandwagon vs. need-focused)	No main effect; interaction with appeal
95	Davidson and Laroche (2018), study 2)	No ^a	210	Writing	Aversive	Donation intention	Human-animal comparability (uniqueness vs. sameness)	No main effect; interaction with human-animal comparability
96	Dong et al. (2019), study 2	No ^a	79	Writing	Aversive	Spending money (personal vs. prosocial)	Spirituality	No main effect; interaction with spirituality
97	Dong et al. (2019), study 3	No ^a	143	Other	None	Donation amount	Spirituality	No main effect; interaction with spirituality
98	Dong et al. (2019), study 4	Yes	135	Applied	Neutral	Spending money (personal vs. prosocial)	Spirituality	No main effect; no interaction
99	Dunn et al. (2020), study 1	Yes	512	Writing	Neutral	Intention to donate possessions	Possibility of self-transcendence	No main effect; interaction with self-transcendence
100	Dunn et al. (2020), study 4	Yes	326	Writing	Neutral	Intention to donate possessions	Possibility of self-transcendence	No main effect; interaction with self-transcendence

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
101	Dunn et al. (2020), study 5	Yes	397	Writing	Neutral	Intention to donate possessions	Possibility of self-transcendence; self-esteem	Positive main effect; interaction with self-transcendence
102	Fa and Kugihara (2020), study 1	Yes	56	Writing	Aversive	Willingness to donate	Charity type (future vs. general)	Positive main effect; no interaction
103	Fa and Kugihara (2020), study 2	No ^b	127	Writing	Aversive	Willingness to donate	Charity type (future vs. general)	No main effect; interaction with charity type
104	Fa and Kugihara (2020), study 3	No ^b	128	Writing	Aversive	Willingness to donate	Charity type (future vs. general); charity aim (environmental vs. cultural)	No main effect; no interaction; three-way interaction with charity type and aim
105	Ferraro et al. (2005), study 3	No ^a	115	Writing	Aversive	Charity donation	Virtue as a source of self-esteem	No main effect; interaction with virtue as a source of self-esteem
106	Fransen et al. (2008), study 2	Yes	37	Applied	Neutral	Product attitude (foreign vs. domestic)		Positive main effect
107	Jin and Ryu (2021)	Yes	487	Applied	None	Donation intentions; prosocial spending intention	Selfishness; narcissism; greed; materialism; status consumption tendency; system-justifying tendency	Positive main effect; interactions with selfishness, narcissism, greed, materialism, status consumption tendency, system-justifying tendency
108	Schindler and Reinhard (2015), study 2	Yes	122	Applied	Aversive	Donation intention	Request type (door in the face vs. critical)	No main effect; no interaction

(Continues)

TABLE 4 | (Continued)

ID	Authors, year, study #	Included in meta-analysis	Total N	MS manipulation	Control manipulation	Dependent variable(s)	Moderator(s)	Key finding(s)
Sharing behavior								
109	Jonas et al. (2013), study 3	Yes	74	Writing	Aversive	Sharing behavior	Norms (fairness vs. neutral)	No main effect; interaction with norms
110	Zaleskiewicz et al. (2015), study 1	Yes	62	Other	Aversive	Sharing behavior		Positive main effect
111	Zaleskiewicz et al. (2015), study 2	Yes	41	Other	Aversive	Sharing behavior		Positive main effect
112	Zaleskiewicz et al. (2015), study 3	Yes	136	Other	Aversive	Sharing behavior	Incentive structure (pro-social vs. pro-selfish)	No main effect; no interaction

Note: Total N: includes mortality salience and control conditions. MS manipulation: writing = writing task (e.g., two open-ended questions about their own death), applied = applied stimulus (e.g., advertisement, video), other = other general manipulations (e.g., death scale, closeness to cemetery). Control manipulation: 1 = aversive (e.g., dental pain, failure), 2 = neutral (e.g., watching TV, music). Key findings: positive effects = significant effects at <0.05 level in line with TMT reasoning, as described in our categorization; negative effects = significant effects at <0.05 level opposing TMT reasoning; mixed effect = significant effect for one or more DVs, while for other DV(s) no effect was found.

^aLack of data.

^bOutlier.

^cWithin design.

products” ($g=0.10$). Effect sizes for the “protect my culture” subcategories also did not significantly differ ($F(1, 50)=3.24$, $p=0.08$), although the comparison of “in/out-group attitudes, intentions, and behaviors” ($g=0.22$) with “nostalgia and product age” ($g=0.39$) did approach significance. On average, this means that results across DVs were found to be in line with the MS hypothesis, except in case of “greed and materialistic tendencies.” We also tested whether certain effect size characteristics (e.g., type of measurement), as well as study characteristics (e.g., type of sample, type of stimulus), would serve as moderators. These results are reported in Appendix D.²

Figure 3 displays the effect estimates per DV subcategories. Note that, although the effect estimates for the pro-social subcategories “charity donations” ($g=0.19$) and sharing money ($g=0.43$) perhaps appear to differ, there were few effect sizes recorded for the “Sharing attitudes, intentions, and behaviors.” The consequence of this is that statistical power was probably too low to detect differences between the response subcategories with enough certainty.

4 | Discussion

The current research presents an extensive overview of consumer-focused TMT studies and provides effect sizes concerning MS effects on consumer responses. We distinguished three main types of consumer-related responses (“I want more,” “protect my culture,” and “pro-social”), to categorize the many different types of outcome variables studied in this field. The systematic review included 112 studies and the meta-analysis included 79 studies, with 125 effect sizes.

The meta-analysis revealed a small but positive overall effect size ($g=0.21$) of MS on consumer responses, with similar results across the three categories (g between 0.13 and 0.30). For the “I want more” responses, the significant effect was driven by the subcategories “luxury and status products” and “money attitudes” (for the subcategories “greed and materialistic tendencies” and “appeal of advertisements, brands and products” no significance was reached). The results suggest a small but reliable effect of MS on consumer responses. The observed effect size is smaller than once assumed (e.g., Burke et al. 2010), but this is consistent with recent meta-analytic findings (Chen et al. 2022; Schindler et al. 2023). An important implication of this is the need for studies with sufficient power to detect small effects. To detect such an overall small effect size, 357 participants per condition are needed³. In our sample, only two studies (Bruine de Bruin and Ulqinaku 2021; Okazaki et al. 2019) meet that requirement. This might indicate that results from previous studies do not always reflect a true effect (Button et al. 2013) and the field needs more high-powered studies.

While the results of the meta-analysis can be described in relatively few words and be captured in a clear graph, suggesting a seemingly clear outcome of small but significant effects, the systematic review revealed a more complex reality. First, the systematic review uncovered differences concerning the hypothesized main effects; 63% of the included studies expected MS main effects to occur, while 37% did not expect MS main

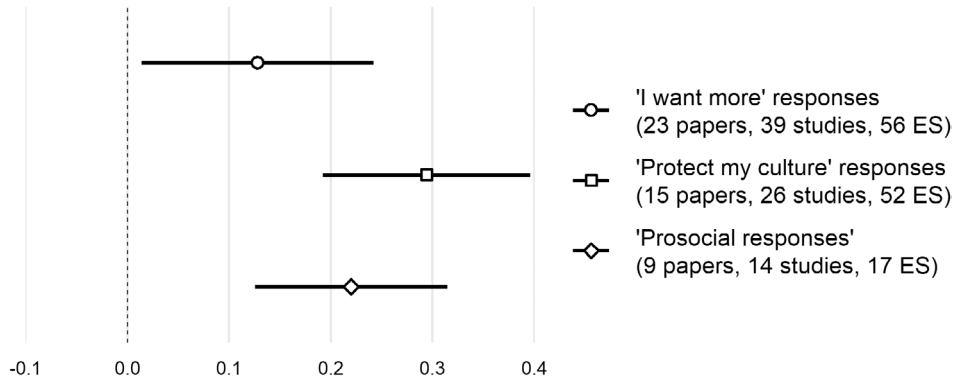


FIGURE 2 | The effect estimates (Hedges' g) for each DV category. Abbreviation: ES = the number of included effect sizes.

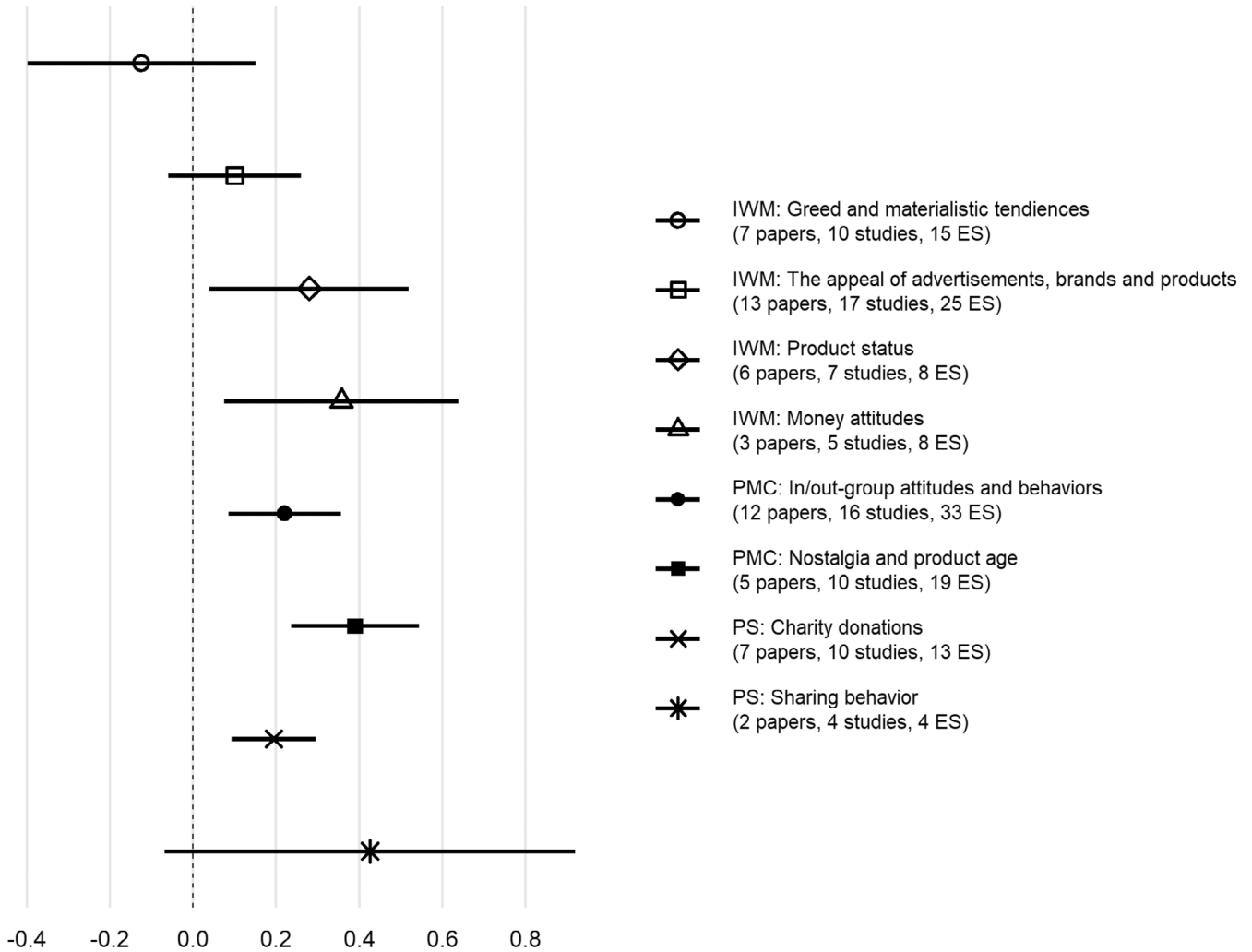


FIGURE 3 | The effect estimates (Hedges' g) for each subcategory of the DV categories. Abbreviations: ES = the number of included effect sizes, IWM = "I want more" responses, PMC = "protect my culture" responses, PS = "pro-social" responses.

effects. Interestingly, when main effects were expected, they were found in 66% of the studies, but when a study did not hypothesize a main effect, only in 27% of the cases main effects were observed. Overall, in 52% of the cases main effects were found, and of those cases, 31% found mixed results (i.e., partly in line with-, partly not in line with the MS hypothesis) or results opposing TMT assumptions. The systematic review shows dispersed MS effects on consumer responses, which relates to an important criticism of TMT: the lack of falsifiability.

Previously it has been argued that TMT is so diffuse it can account for any outcome and even seemingly opposing results can be interpreted as consistent with the theory (e.g., Martin and Van den Bos 2014). This also applies to the TMT consumer domain; researchers have made contradicting predictions of MS effects and found opposing results, such as both increased greed and increased sharing, as well as increased saving and increased spending. As the theory can explain various and opposing consumer responses, questionable research practices may have

been employed, specifically HARKing (hypothesizing after results are known), as also suggested by Chen et al. (2022). An important recommendation for future research is therefore pre-registering studies, forcing authors to explain their theoretical reasoning and expectations in advance. Although preregistrations have become more common in recent years, only one paper in our sample included preregistered studies (Dunn et al. 2020).

Another outcome of the systematic review is that a great variety of moderators were examined in the included studies, but only a handful were studied in more than one paper. Next to that, evidence for these moderators (including trait self-esteem and primed cultural worldviews) was mixed. This calls for further theorization of the working of TMT, specifically related to the two central pillars of TMT, self-esteem and cultural worldviews. Regarding the latter, in their review, the founders of TMT describe that it is unclear when people turn to a specific aspect of their cultural worldview and that more insight into which anxiety-buffer elements will be used in any given instance is needed (Pyszczynski et al. 2015). Several studies within the consumer domain focused on this by including primes related to world views, such as different (social) norms (Fritsche et al. 2010; Jonas et al. 2013), worldview affirmation (Sullivan et al. 2011), or the presence of karma (Chen et al. 2019), with mixed results. While not set in the consumer domain, a recent meta-analysis found a small to medium-sized interaction effect of MS and norm primes (Schindler et al. 2023), but noted that it is often unclear whether a certain worldview is present in participants, and thus that norm primes might not activate the worldview that researchers expect it to do. A more systematic investigation of different cultural worldviews seems relevant to the TMT consumer domain.

Next to a focus on cultural worldviews, a more systematic examination of the role of self-esteem is needed. In the systematic review, general self-esteem was measured in seven (out of 112) studies, of which only two found that MS effects were stronger for low-self-esteem individuals (Mandel and Smeesters 2008, Studies 1 and 2). This lack of evidence for the central TMT anxiety buffer hypothesis has been documented before in reviews regarding TMT research (Dar-Nimrod 2022; Fransen et al. 2019; Martin and Van den Bos 2014). It was previously pointed out (e.g., Burke et al. 2010; Dar-Nimrod 2022) that there may be an interesting difference between explicit self-esteem (as often measured by the self-report Rosenberg scale; Rosenberg 1965) and more implicit forms. Schmeichel et al. (2009) found that individuals with high implicit self-esteem, which is relatively inaccessible to conscious awareness and (therefore) less prone to self-presentational biases, are better protected against MS. Although this outcome seems very relevant, other forms of self-esteem have not been thoroughly studied in TMT research and have not been included in any TMT consumer studies, so this might be an interesting avenue for further research.

Furthermore, the present study predominantly focused on the direct relationship between MS and consumer responses and does not investigate certain aspects, such as context, psychological states, or sample differences. This could be an important avenue for future research, as MS effects could potentially have dissimilar effects on people from different countries (see Minton et al. 2021), or after certain traumatic events (see Ruvio

et al. 2014). A systematic inclusion of these types of moderators could shed light on why people respond to MS in various ways.

4.1 | Limitations

There are some known limitations to systematic reviews and meta-analyses. The research questions should drive the entire literature review process (Xiao and Watson 2019), and therefore, researchers' choices have a great impact on the literature selection. Concerning the study selection, the inclusion criteria and definition of what constitutes a 'consumer response' might be debatable. We chose to include all attitudes, intentions, and behaviors specifically related to money, materialism, or greed, and to include attitudes, intentions, and behaviors toward material products, consumer brands, or advertisements for consumer goods. This meant that, for example, a study that contained a measure of the consumption amount of (domestic versus) foreign chocolate (Friese and Hofmann 2008) was included because we perceived this as a measure of a specific consumer choice. On the other hand, a study that contained a measure of fattening food consumption (Goldenberg et al. 2005) was excluded because the study context was women's physique and health risk behavior. Other inclusion criteria might result in different outcomes, as is illustrated by a recent review by Gobrecht and Marchand (2022), that focused on the conceptualization of MS and also included a literature review. Because they used a broader definition of consumer behavior, focused on TMT and SST, and used an inclusion criterion of journal rankings, this resulted in a different literature sample. Specifically, Gobrecht and Marchand included 33 articles, whereas we included 60 articles, with an overlap of only 15 articles. Moreover, our review has a distinct focus on the expectations driving empirical studies and the impact they might have had on the outcomes, whereas Gobrecht and Marchand predominantly attribute divergent outcomes to MS conceptualizations. This shows that the choices made in the review process can greatly impact the sample and consequently lead to supplemental conclusions. Nevertheless, we believe that the present categorization fits with thinking about MS effects in the consumer domain and creates the needed order in the vast volume of available studies. More importantly, we have been transparent about the choices made and interested readers can do additional analyses (e.g., how changing certain criteria influences results) since the data is freely accessible via OSF.

As a second limitation, we would like to acknowledge the absence of publication bias checks in this paper. Publication bias checks aim to assess whether the observed effect estimates may be overestimated. This could be the case when studies that reported expected findings were more likely published than studies presenting unexpected (often non-significant) findings. The problem we faced was that the studies included in the meta-analysis were not characterized by one uniform and ever-present MS hypothesis. Different, sometimes contradicting, expectations about MS effects on consumer responses have been deduced from TMT in previous research (e.g., the Mercedes example we describe on page 30 of this paper). In another large body of included studies, only interaction effects were hypothesized. This means that there were instances where we needed to introduce consistency to the data, inevitably causing the results of any publication bias checks to no longer be valid.

Earlier syntheses of MS effects suggest that publication bias is likely present in TMT research (e.g., Chen et al. 2022; Schindler et al. 2023). We, therefore, recommend interpreting our effect estimates with caution, as they may be smaller than our meta-analysis indicates.

5 | Conclusion

The systematic review showed a large variety in the predictions and results of MS-induced consumer responses, and systematic inclusion of moderating variables is lacking. Yet, the subsequent meta-analysis revealed a small significant overall effect of MS on consumer responses and similar effects over the three consumer response categories. Previous consumer research thus appears to provide some support for the MS hypothesis. However, future TMT research in the consumer domain can benefit greatly from experimental studies that further explore why certain responses are evoked by MS and clearly describe this reasoning in advance in preregistered studies with large samples. We hope that the present research contributes to the TMT consumer domain and will help researchers work with a more informed agenda for their future research. This research may contribute to a deeper understanding of mortality salience, a concept that holds significant importance due to the inevitable reminders of death we encounter in daily life, whether through news reports, natural disasters, or personal losses. This becomes even more relevant, as humankind faces incremental challenges and uncertainties, such as global conflicts and environmental threats. In addition, as our research shows, these encounters with death might have real-world implications, influencing our (consumer) behavior and decision-making.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

All data are available via the Open Science Framework: https://osf.io/c94gs/?view_only=17114588a588424ab605e988f26a3477.

Endnotes

¹The literature search was conducted on April 19, 2022, and the backward and forward literature search on March 29, 2023.

²The only significant moderator found for MS effects on “I want more” responses was the average age of the sample: effects were smaller the older participants were. For the “protect my culture” responses, we found that MS effects were significantly larger among European samples (vs. North-American and Asian samples), when attitudes were measured (vs. intentions and behaviors), and when the DVs were measured using scales (vs. open questions; effects were not significantly different compared to multiple choice questions). The results showed no other interaction effects.

³Detectable effect size was calculated with G*Power by applying a sensitivity power analysis for an ANOVA (fixed effects, omnibus, one-way) assuming effect size $f=0.105$ (converted from $g=0.21$), power = 0.80, alpha = 0.05 and two groups.

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Appendix A

Search Strategy

PsycINFO

#1 Terror Management Theory

"death and dying" / OR

death anxiety / OR

death anxiety.ti,ab,id. OR

death attitudes / OR

dying.ti,ab,id. OR

existential anxiety.ti,ab,id. OR

existentialism / OR

mortality.ti,ab,id. OR
 near death experiences / OR
 terror management.ti,ab,id. OR
 terror management theory/
 #2 Consumerism
 advertisement*.ti,ab,id. OR
 advertising / OR
 advertising.ti,ab,id. OR
 brand*.ti,ab,id. OR
 brand names / OR
 brand preferences / OR
 buying.ti,ab,id. OR
 commercials.ti,ab,id. OR
 consumer attitudes / OR
 consumer attitude*.ti,ab,id. OR
 consumer behavior / OR
 consumer behavior?r.ti,ab,id. OR
 consumer preference*.ti,ab,id. OR
 consumer psychology / OR
 consumerism / OR
 drinking behavior / OR
 drinking behavior?r.ti,ab,id. OR
 eating attitudes / OR
 eating attitude*.ti,ab,id. OR
 eating behavior / OR
 eating behavior?r.ti,ab,id. OR
 eating habit*.ti,ab,id. OR
 food intake / OR
 food intake.ti,ab,id. OR
 food preferences / OR
 food preference*.ti,ab,id. OR
 greed / OR
 greed.ti,ab,id. OR
 materialism / OR
 materialism.ti,ab,id. OR
 money / OR
 money.ti,ab,id. OR
 persuasi*.ti,ab,id. OR
 persuasive communication / OR
 retailing / OR
 shopping.ti,ab,id. OR
 spending.ti,ab,id. OR
 television advertising/
 television ad*.ti,ab,id.

Communication & Mass Media Complete

#1 Terror Management Theory

AB(death OR dying OR mortality OR existential* OR “terror management”) OR KW(death OR dying OR mortality OR existential* OR “terror management”) OR SU(death OR dying OR mortality OR existential* OR “terror management”) OR TI(death OR dying OR mortality OR existential* OR “terror management”)

#2 Consumerism

AB (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending) OR KW (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending) OR SU (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending) OR TI (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending)

Business Source Premier

#1 Terror Management Theory

AB(death OR dying OR mortality OR existential* OR “terror management”) OR KW(death OR dying OR mortality OR existential* OR “terror management”) OR SU(death OR dying OR mortality OR existential* OR “terror management”) OR TI(death OR dying OR mortality OR existential* OR “terror management”)

#2 Consumerism

AB (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending) OR KW (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending) OR SU (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending) OR TI (advertisement* OR advertising OR brand* OR buying OR commercials OR “consumer attitude*” OR “consumer behavior*” OR “consumer preference*” OR “consumer psychology” OR consumerism OR “drinking behavior*” OR “eating attitude*” OR “eating behavior*” OR “eating habit*” OR “food intake” OR “food preference*” OR greed OR materialism OR money OR persuasi* OR retailing OR shopping OR spending)

Appendix B

Intercoder Reliability

TABLE B1 | Results for intercoder reliability for each of the coded moderator variables.

Type of variable	Moderator	Coding categories	α
Context factor	Publication year	Year in which each study was published	1
	Publication type	Journal, doctoral dissertation or conference paper	0.812
	Participant age	Average age of participants in each study	0.989
	Participant gender	Percentage of female participants in each study	This variable was coded later, solely by the first author
	Sample	Student or general sample	0.874
	Nationality	Nationality of the participants	0.821
Category	Main category	I want more, Protect my culture, or Prosocial	0.985
	Sub category	Greed and materialistic tendencies; the appeal of advertisements, brands, and products; luxury and status products; and money attitudes, in/out-group attitudes, intentions and behaviors; product age and nostalgia, or charity donations; sharing money	This variable was coded later, solely by the first author
Manipulation	Manipulation type	Writing task, applied stimulus, other general	0.924
	Control type	Neutral, aversive	0.901
	Number of delay tasks	0, 1, 2, or not applicable	This variable was coded later, solely by the first author
Dependent variable	Dependent variable type	Attitude, intention, or scale	0.820
	Dependent variable measure	Scale, choice, open-ended	0.920

Note: α = Krippendorff's Alpha.

Appendix C

Effect Estimates per Included Study

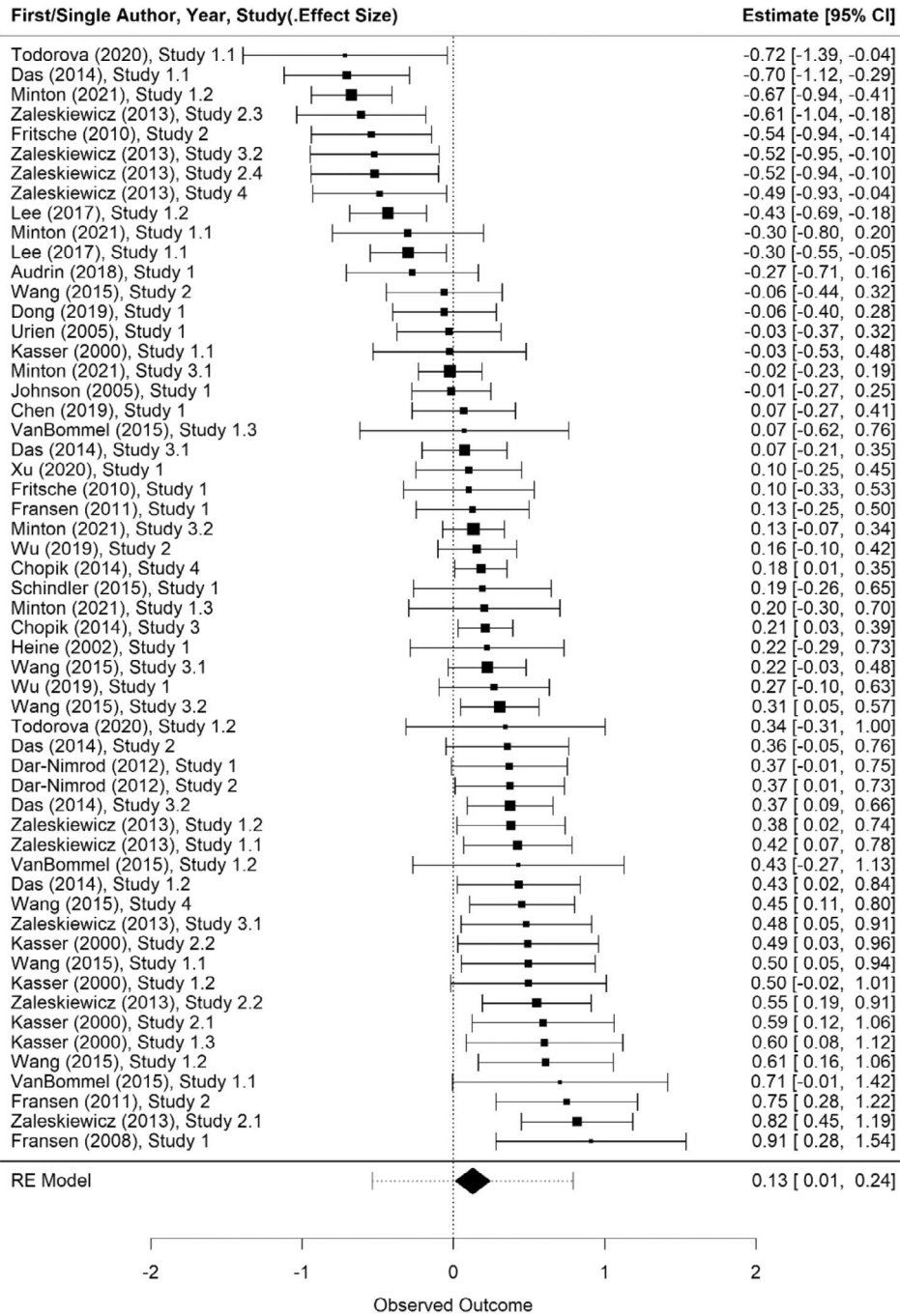


FIGURE C1 | Forrest plot of included studies for “I want more” responses.

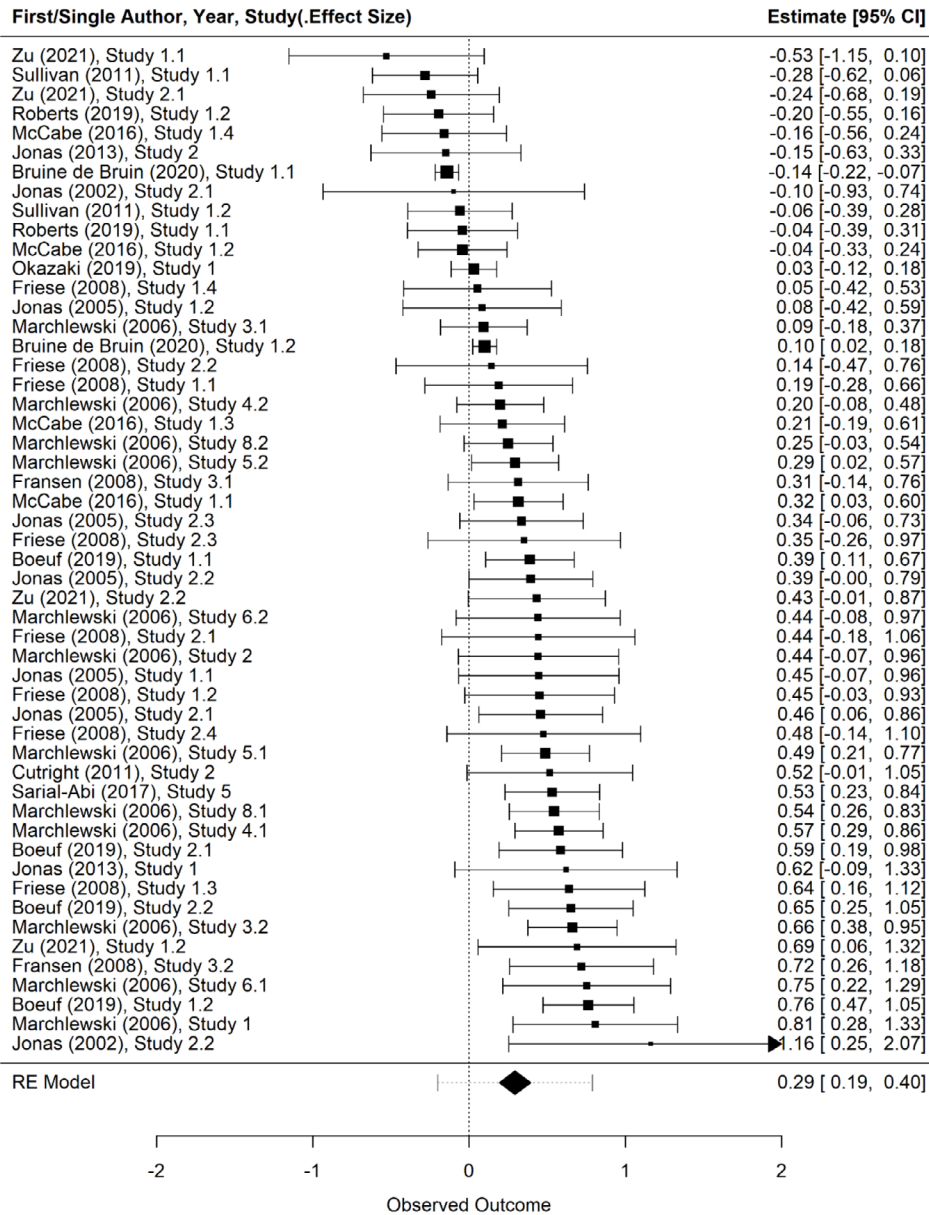


FIGURE C2 | Forrest plot of included studies for “protect my culture” responses.

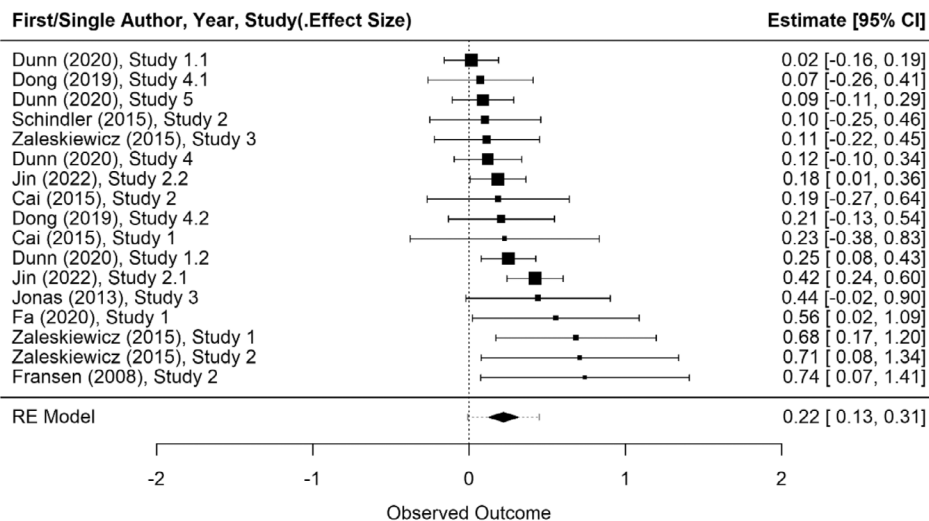


FIGURE C3 | Forrest plot of included studies for “pro-social” responses.

Appendix D

Results for Moderator Analyses

Below, we report a number of moderator analyses with effect size characteristics (e.g., type of measurement) as well as study characteristics

(e.g., type of sample, type of stimulus) as moderators on the effects of MS on both “I want more” responses (see Table D1) and “protect my culture” responses (see Table D2). Significant results are highlighted in bold.

TABLE D1 | Results for the moderator analyses of MS effects on “I want more” responses.

Moderator		Studies	ES	Estimate	95% CI	F	p
DV subcategory (ref: Appeal)	Intercept	39	56	0.12	[-0.04, 0.28]	$F(3, 52) = 181.74$	0.152
	Greed	39	56	-0.22	[-0.49, 0.05]		0.103
	Luxury	39	56	0.18	[-0.13, 0.48]		0.255
	Money	39	56	0.25	[-0.07, 0.57]		0.124
(ref: Greed)	Intercept	39	56	-0.11	[-0.32, 0.11]		0.328
	Appeal	39	56	0.22	[-0.05, 0.49]		0.103
	Luxury	39	56	0.40	[0.06, 0.73]		0.022
	Money	39	56	0.47	[0.12, 0.83]		0.010
(ref: Luxury)	Intercept	39	56	0.29	[0.03, 0.55]		0.029
	Greed	39	56	-0.40	[-0.73, -0.06]		0.022
	Appeal	39	56	-0.18	[-0.48, 0.13]		0.255
	Money	39	56	0.08	[-0.31, 0.46]		0.694
Participant age	Intercept	27	38	0.89	[0.29, 1.50]	$F(1, 36) = 133.82$	0.005
	Age	27	38	-0.03	[-0.05, -0.01]		0.010
Participant age v2	Intercept	39	56	0.89	[0.30, 1.47]	$F(1, 54) = 204.62$	0.004
	Age	39	56	-0.03	[-0.05, -0.01]		0.010
Participant gender	Intercept	34	48	-0.10	[-0.80, 0.60]	$F(1, 46) = 187.18$	0.771
	Gender	34	48	0.36	[-0.79, 1.50]		0.533
Participant gender v2	Intercept	39	56	-0.09	[-0.76, 0.59]	$F(1, 54) = 209.06$	0.792
	Gender	39	56	0.36	[-0.75, 1.47]		0.516
Type of sample (ref: non-student)	Intercept	39	56	0.06	[-0.10, 0.22]	$F(1, 54) = 217.82$	0.441
	Student	39	56	0.13	[-0.10, 0.35]		0.264
Nationality sample (ref: North-American)	Intercept	38	55	0.12	[-0.05, 0.30]	$F(2, 52) = 208.25$	0.167
	Asian	38	55	-0.06	[-0.38, 0.25]		0.691
	European	38	55	0.04	[-0.21, 0.29]		0.759
(ref: Asian)	Intercept	38	55	0.06	[-0.22, 0.34]		0.677
	North-American	38	55	0.06	[-0.25, 0.38]		0.691
	European	38	55	0.10	[-0.23, 0.44]		0.549
Type of stimulus (ref: Writing task)	Intercept	39	56	0.14	[-0.02, 0.31]	$F(2, 53) = 215.55$	0.093
	Applied	39	56	-0.04	[-0.31, 0.23]		0.762
	Other	39	56	0.00	[-0.31, 0.31]		0.980
	Intercept	39	56	0.10	[-0.11, 0.31]		0.341
(ref: Applied)	Writing task	39	56	0.04	[-0.23, 0.31]		0.762
	Other	39	56	0.04	[-0.30, 0.37]		0.827
Type of control (ref: Neutral)	Intercept	39	56	0.13	[-0.03, 0.30]	$F(1, 54) = 222.23$	0.120
	Aversive	39	56	0.00	[-0.23, 0.22]		0.972

(Continues)

TABLE D1 | (Continued)

Moderator		Studies	ES	Estimate	95% CI	F	p	
Number of delay tasks	Intercept	39	56	0.06	[-0.15, 0.27]	$F(1, 54) = 214.28$	0.577	
	Delay tasks	39	56	0.06	[-0.09, 0.20]		0.428	
Type of DV	Intercept	39	56	0.14	[0.00, 0.27]	$F(1, 54) = 221.1$	0.052	
(ref: Attitudes)	Intentions	39	56	-0.02	[-0.24, 0.19]		0.827	
Type of measurement	Intercept	39	56	0.13	[-0.01, 0.28]	$F(2, 53) = 211.62$	0.073	
	(ref: Scale)	Multiple choice	39	56	-0.10		[-0.49, 0.29]	0.602
	Open questions	39	56	0.02	[-0.25, 0.29]		0.875	
(ref: Open questions)	Intercept	39	56	0.15	[-0.07, 0.38]		0.180	
	Scale	39	56	-0.02	[-0.29, 0.25]		0.875	
	Multiple choice	39	56	-0.12	[-0.55, 0.30]		0.565	

Note: v2 = missing values were imputed by the mean value. Bold values denote statistical significance at the $p < 0.05$.

TABLE D2 | Results for the moderator analyses of MS effects on “protect my culture” responses.

Moderator		Studies	ES	Estimate	95% CI	F	p	
DV subcategory	Intercept	26	52	0.22	[0.09, 0.35]	$F(1, 50) = 156.17$	0.001	
	(ref: Group)	Nostalgia	26	52	0.18		[-0.02, 0.38]	0.078
Participant age	Intercept	20	44	0.59	[0.25, 0.92]	$F(1, 42) = 119.37$	0.001	
	Age	20	44	-0.01	[-0.02, 0.00]		0.101	
Participant age v2	Intercept	26	52	0.53	[0.17, 0.89]	$F(1, 50) = 157.88$	0.005	
	Age	26	52	-0.01	[-0.02, 0.00]		0.183	
Participant gender	Intercept	24	49	0.53	[0.24, 0.82]	$F(1, 47) = 188.6$	0.001	
	Gender	24	49	-0.41	[-0.93, 0.10]		0.111	
Participant gender v2	Intercept	26	52	0.52	[0.22, 0.82]	$F(1, 50) = 194.8$	0.001	
	Gender	26	52	-0.43	[-0.95, 0.10]		0.107	
Type of sample	Intercept	26	52	0.25	[0.14, 0.36]	$F(1, 50) = 187.71$	0.000	
	(ref: non-student)	Student	26	52	0.21		[-0.04, 0.46]	0.093
Nationality sample	Intercept	26	52	0.11	[-0.04, 0.26]	$F(2, 49) = 122.82$	0.144	
	(ref: North-American)	Asian	26	52	-0.04		[-0.34, 0.26]	0.769
	European	26	52	0.28	[0.10, 0.46]		0.003	
(ref: Asian)	Intercept	26	52	0.06	[-0.20, 0.33]		0.619	
	North-American	26	52	0.04	[-0.26, 0.34]		0.769	
	European	26	52	0.32	[0.05, 0.60]		0.023	
Type of stimulus	Intercept	26	52	0.30	[0.16, 0.43]	$F(2, 49) = 164.68$	0.000	
	(ref: Writing task)	Applied	26	52	0.25		[-0.12, 0.62]	0.179
	Other	26	52	-0.07	[-0.29, 0.14]		0.494	
(ref: Applied)	Intercept	26	52	0.55	[0.21, 0.89]		0.002	
	Writing task	26	52	-0.25	[-0.62, 0.12]		0.179	
	Other	26	52	-0.32	[-0.70, 0.06]		0.094	

(Continues)

TABLE D2 | (Continued)

Moderator		Studies	ES	Estimate	95% CI	F	p
Type of control (ref: Neutral)	Intercept	26	52	0.36	[0.22, 0.50]	$F(1, 50) = 207.51$	0.000
	Aversive	26	52	-0.14	[-0.34, 0.06]		0.155
Number of delay tasks	Intercept	26	52	0.32	[0.15, 0.48]	$F(1, 50) = 197.5$	0.000
	Delay tasks	26	52	-0.02	[-0.16, 0.11]		0.724
Type of DV (ref: Attitudes) (ref: Intentions)	Intercept	26	52	0.43	[0.34, 0.52]	$F(2, 49) = 96.84$	0.000
	Behaviors	26	52	-0.36	[-0.53, -0.20]		0.000
	Intentions	26	52	-0.40	[-0.57, -0.23]		0.000
	Intercept	26	52	0.03	[-0.12, 0.18]		0.698
Type of measurement (ref: Scale) (ref: Open questions)	Attitudes	26	52	0.40	[0.23, 0.57]	$F(2, 49) = 130.21$	0.000
	Behaviors	26	52	0.04	[-0.17, 0.24]		0.719
	Intercept	26	52	0.34	[0.24, 0.45]		0.000
	Multiple choice	26	52	0.18	[-0.24, 0.60]		0.385
	Open questions	26	52	-0.27	[-0.46, -0.08]		0.006
(ref: Open questions)	Intercept	26	52	0.07	[-0.10, 0.24]	0.395	
	Scale	26	52	0.27	[0.08, 0.46]	0.006	
	Multiple choice	26	52	0.46	[0.02, 0.89]	0.042	

Note: v2 = missing values were imputed by the mean value. Bold values denote statistical significance at the $p < 0.05$.