



# Stimuli–organism–response framework: A meta-analytic review in the store environment <sup>☆</sup>

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## ABSTRACT

The authors conduct a meta-analysis that aggregates empirical findings from the stimuli–organism–response (S–O–R) framework. In the retail field, research relies on the S–O–R paradigm to explain and present evidence pertaining to numerous environmental cues and their related effects on consumers' responses. However, the literature review provides positive, negative, and even null results in the S–O–R model, producing doubts about its generalization capacity in the retail field. The study provides a quantitative summary of the bivariate findings regarding the antecedents and the consequences of organism trait (i.e., emotions). The study here corroborates the generalizability of the results into S–O and O–R stages. The authors also confirm the emotions' dependency in the organism factor. The results show that the relationship between arousal and pleasure was significant and positive. Both emotions are responsible for much variation on hedonic and utilitarian motivation for shopping. Arousal-hedonic and pleasure-hedonic relationships have stronger effects from the 28 relationships, indicating that consumer emotions and recreational motivation for shopping are strongly associated. In addition, the study examines all identified studies in terms of the following relevant moderator-variables. Some of them were significant. The paper concludes with a discussion of the implications for practice and further research.

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## 1. Introduction

Retailers acknowledge the importance of store environment as a tool for market differentiation and consumer satisfaction (Levy & Weitz, 1998). According to Lam (2001), store environment consists of many elements, including music, lighting, layout, directional signage and individual elements, and includes both external environment and internal environment.

The seminal conceptualization of Mehrabian and Russell (1974) is the basis of most marketing research studying the impact of internal store environmental on shopping behavior. Mehrabian and Russell (1974) propose that the sensory variables in the environment, the information rate of the atmosphere (a construct that reflects the level of overall uncertainty in the environment), and individual differences in emotional experience influence the affective responses to the environment. This influence induces individuals to approach or avoid the environment. This sequence of events is stimulus–organism–response (S–O–R).

Research relies on the S–O–R paradigm to explain and present evidence pertaining to numerous environmental cues (e.g., color, lighting, music, crowding, and fragrance) and their related effects on buyers' internal states and external responses. Despite numerous studies on store environment, findings are insufficient to provide a detailed understanding of which are the atmospheres' cues effects on shopping behavior. Specifically, the literature review provides positive, negative, and even null results in the S–O–R model, producing doubts about its generalization capacity in the retail field. A meta-analysis of empirical findings on the predictors and consequences of S–O–R framework bridges that gap.

The research effort is useful because the research tries to reconcile inconsistent results and establish the generalizability of the relationships between emotions and their antecedents/consequences. Also, research on the S–O–R model appears in various methodological contexts, yet the research does not evaluate the robustness of the effects across study conditions (such as sample and stimulus features). This study explains differences in the results of previous studies by investigating various characteristics that could moderate the effects.

The paper presents a conceptual framework with proposed assumptions that guide the S–O–R framework; describes the meta-analytic procedures, including the search process, database development, effect sizes computation, and integration; expresses a quantitative summary of the adjusted mean effect sizes for relationships; presents the moderating analysis; and discusses the main findings.

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## 2. Mehrabian and Russell's (1974) theoretical framework

The scholar literature on store environment draws its theoretical foundations from environmental psychology theory and the S–O–R paradigm (Turley & Milliman, 2000). Fig. 1 presents Mehrabian and Russell's (1974) theoretical framework.

According to Fig. 1, the S–O–R framework assumes that the environment contains stimuli (S) that cause changes to people's internal, or organismic, states (O), which in turn cause approach or avoidance responses (R) (Mehrabian & Russell, 1974). Using the traditional S–O–R model as its point of departure, Mehrabian and Russell's environmental theory attempts to explain emotional reactions that occur from exposure to the stimuli of a particular environment (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). Variation in stimuli present within the environment is information rate or load. Environmental load is the amount of environmental novelty and complexity (Donovan & Rossiter, 1982). Novelty is how well an individual knows an environment and can predict what will happen (Mehrabian, 1977). Complexity is the number of elements, features, and changes in an environment (Russell & Mehrabian, 1977). Thus, a high-load environment is one that is novel, unpredictable, and complex (Donovan & Rossiter, 1982; Mehrabian, 1980). The environmental theory suggests that retailers might manipulate store stimuli in order to create different emotional responses.

In the second part of the S–O–R model, the organism component represents individuals' emotional reactions (i.e., temperament) to an environment (Pitrie, 1967). Mehrabian (1977, 1995) defines temperament as the average of an individual's emotional states across a representative sample of everyday situations. Consequently, a general formulation of emotional states could provide the foundation for a corresponding general description of emotional traits or temperament. Prototypical emotional episodes vary along certain dimensions, such as intensity, degree of pleasure, or degree of activation (Russell & Pratt, 1980). Roller coaster rides are not as unpleasant as being chased by a bear. Rather, each specific case involves a specific degree of pleasure and activation (Russell & Barrett, 1999).

To complete the model, responses (the R component) categorize approach and avoidance behaviors. According to Mehrabian and Russell's theory, the level of arousal and the pleasure experienced by an individual will determine his/her approach-avoidance response. The desire to enter or leave a particular environment – approach-avoidance behavior – includes three important aspects: a desire to explore an environment, a desire to communicate/interact with others in the environment and a reported satisfaction with the surroundings (Donovan & Rossiter, 1982). Thus, consumers who find an environment pleasant and arousing will want to explore the environment and interact with others in the atmosphere, reporting greater satisfaction with the store (Donovan, Rossiter, Marcolyn, & Nesdale, 1994). In that sense, using environmental psychology theory, understanding consumers' response to an atmosphere requires studying emotional reactions (Diener, Larsen, Levine, & Emmons, 1985; Larsen, Diener, & Emmons, 1986).

### 2.1. P–A–D emotions structure

According to Mehrabian and Russell's theory, in the organism condition all emotional reactions to an atmosphere fall into three independent states: Pleasure–Displeasure (P), or a broad level of enjoyment and gratification; Arousal–Nonarousal (A), or general level of physical activity and mental alertness; and Dominance–Submissiveness (D), or feelings of control versus lack of control over one's activities and surroundings. This triple structure suggests the use of +P and –P as shorthand notations for pleasure and displeasure; +A and –A represent arousal and nonarousal emotional states; and +D and –D represent dominance and submissiveness. P–A–D scales form nearly independent axes of a three-dimensional temperament space, varying from –1 to +1. Various personality measures are straight lines that pass through the intersection point of the three axes. Personality types, in turn, are regions, and individuals are points in the three-dimensional space (Russell & Pratt, 1980).

Mehrabian and Russell (1974, p.18) define arousal “as an affective property (dimension) ranging from sleep to frantic excitement.” The second factor, pleasantness, is the hedonic valence (pleasant or unpleasant) of an affective response to a stimulus that comes from the extent to which the stimulus (the target of the affective response) enables consumers to achieve their salient goal(s). Dominance–submissiveness is feeling control over situations and/or others versus feeling the control and influence of external factors.

The P–A–D temperament model is heuristic for a general description of personality. For instance, a combination of pleasant, arousable and dominant characteristics defines affiliation, extroversion, nurturance, and arousal seeking, whereas pleasant, arousable, and submissive qualities define dependency (Mehrabian, 1980, 1987). Anxiety and neuroticism are unpleasant, arousable, and submissive qualities, whereas hostility and aggressiveness involve unpleasant, arousable, and dominant characteristics (Mehrabian & O'Reilly, 1980). Depression consists simply of unpleasant and submissive attributes, being neutral with respect to trait arousability (Mehrabian & Bernath, 1991).

The dominance factor is the weakest part of the model in empirical research. Hence, subsequent research consistently finds that pleasantness and arousal explain most of the variance in approach-avoidance behaviors (Donovan & Rossiter, 1982; Mehrabian, 1980, 1987, 1995; Russel & Mehrabian, 1978; Russell & Pratt, 1980). Then, Russell and Pratt (1980) propose elimination of the factor on the basis that dominance requires a cognitive (rather than an affective) judgment on the part of the individual. Thus, this study uses only the arousal and pleasure factors. After explaining S–O–R and P–A–D structures, this paper presents mixed results from studies that motivate the research.

### 3. S–O–R empirical inconsistencies

Despite a significant volume of research on the relationship of arousal and pleasure on shopping behavior, the findings regarding

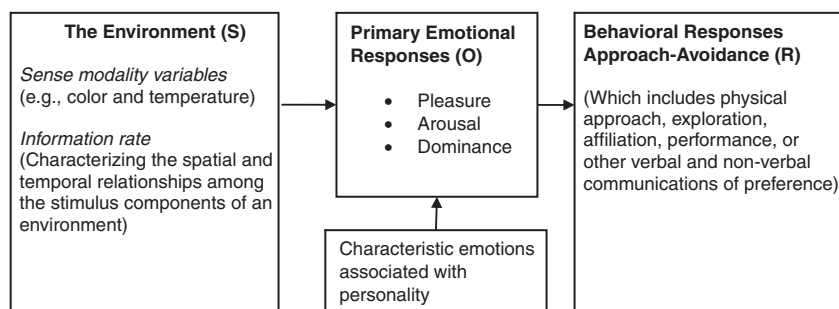


Fig. 1. S–O–R framework Mehrabian and Russell (1974).  
Source: Mehrabian and Russell (1974, p.8).

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