EFFECTS OF MUSIC ON CONSUMER MEMORY, ATTITUDES AND TIME PERCEPTION

BARIŞ URSAVAŞ

BOĞAZİÇİ UNIVERSITY

2011

EFFECTS OF MUSIC ON CONSUMER MEMORY, ATTITUDES AND TIME PERCEPTION

Dissertation submitted to the Institute for Graduate Studies in the Social Sciences

In partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Management

by

Barış Ursavaş

Boğaziçi University

2011

Dissertation Abstract

Barış Ursavaş, "Effects of Music on Consumer Memory, Attitudes and Time Perception"

This study is designed to explore the effects of music on various aspects of consumer behavior.

The first experiment investigates how musical tempo and rhythm influence consumers' time perceptions. Original music and digital technology are used to manipulate tempo and rhythm in isolation from other musical elements. Rhythm is used as an independent variable for the first time in the music-related time perception literature. Findings reveal a main effect of musical tempo on time perception, where higher tempo implies longer duration estimates. Tempo is also found to moderate the effect of rhythm on duration judgments.

The second experiment explores how dramatic contrast, a construct proposed by the author to define the specific type of emotional ambivalence that results from conflicting music and message emotions in an ad, affects consumers' memory, time perception and attitudes toward the ad. The moderating role of discomfort with ambiguity is also observed. Original music is composed to create the experimental stimuli. Results reveal that consumers who have a high level of discomfort with ambiguity generate worse message recognition and less favorable brand attitudes toward ads that contain dramatic contrast. Dramatic contrast also results in shorter duration estimates regardless of the level of discomfort with ambiguity.

Tez Özeti

Barış Ursavaş, "Müziğin Tüketici Hafızası, Zaman Algısı ve Reklam Tutumuna olan Etkileri"

Bu çalışmanın amacı, müziğin tüketici davranışlarının çeşitli boyutlarına olan etkilerini araştırmaktır.

İlk deney, tempo ve ritmin tüketicilerin zaman algısı üzerindeki etkisini incelemektedir. Bu iki değişkeni diğer müzikal değişkenlerden tam bağımsız şekilde manipüle edebilmek için çalışmada özgün müzik ve sayısal müzik teknolojisi kullanılmıştır. Zaman algısı literatüründe ilk kez bu çalışmada ritm bir bağımsız değişken olarak kullanılmıştır. Sonuçlar hızlı temponun algılanan süreyi uzattığını ortaya koymaktadır. Ayrıca, ritm-zaman algısı ilişkisi üzerinde temponun moderasyon etkisi gözlemlenmiştir.

İkinci deney, dramatik zıtlığın tüketici hafızası, zaman algısı ve reklam tutumları üzerindeki etkisini incelemektedir. Bir reklamda yeralan müzik ve mesajdan kaynaklanan zıt duyguların oluşturduğu duygusal karmaşaya dramatik zıtlık adı verilmiştir. Ayrıca, belirsizlikten duyulan rahatsızlığın (discomfort with ambiguity) bu ilişki üzerindeki moderasyon etkisi de gözlemlenmiştir. Çalışmada özgün reklam müzikleri kullanılmıştır. Sonuçlar belirsizlikten yüksek miktarda rahatsızlık duyan tüketicilerin dramatik zıtlık taşıyan reklamlara karşı daha olumsuz tutumlar ve daha zayıf bir hafıza geliştirdiğini ortaya koymaktadır. Ayrıca, dramatik zıtlığın -belirsizlikten duyulan rahatsızlıktan bağımsız olarak- algılanan süreyi uzattığı da tespit edilmiştir.

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the encouragement and guidance of Professor Cengiz Yılmaz. Like a Jedi Master, he taught me with patience and wisdom how to use the force to complete this otherwise arduous task. I am also grateful to Professor Muzaffer Bodur, who always believed in me since my first day at Boğaziçi University. She was there when I most needed care and understanding.

I would like to express my gratitude to my dissertation committee members as well. I am deeply thankful to Assistant Professor Özlem Hesapçı Sanaktekin, a bright researcher and a dear friend, for the never-ending support she gave me throughout the process. Her energy kept me going when I grew weary. I also thank Professor Ayşegül Toker and Assistant Professor Ulaş Akküçük, for their valuable contributions.

During this dissertation process, I had the privilege to work with many friends. I am indebted to Erdem and Engin Özyılmaz, Tolga Girici, Murat Caner, Sertaç Sertdemir, Murat Açıkalın, Burçin Aktan, and Burhan Güven for the invaluable support they gave me during the preperation of the experimental stimuli. I am also grateful to Selin Küçükkancabaş and Pınar Yıldırım, fellow Ph.D. candidates, for being available whenever I needed their help.

Finally, I would like to thank my family for their limitless love and support. But above all, I thank Kuzey Ursavaş, my wonderful daughter, who sacrificed a great amount of daddy time to let me finish my work. Her love fills my heart with hope.

This dissertation concludes my five-year long Ph.D. training. Now, I am ready to boldly go where no man has gone before.

CURRICULUM VITAE

NAME OF AUTHOR: Barış Ursavaş
PLACE OF BIRTH: Istanbul, Turkey
DATE OF BIRTH: 26 October 1975

GRADUATE and UNDERGRADUATE SCHOOLS ATTENDED:
- Boğaziçi University
- The City University of New York
- Istanbul University

DEGREES AWARDED:
- Doctor of Philosophy in Management, 2011, Boğaziçi University.
- Master of Business Administration, 2005, The City University of New York.
- Bachelor of Arts, 2000, Istanbul University.

AREAS OF SPECIAL INTEREST:
- Music, advertising, consumer psychology

PROFESSIONAL EXPERIENCE:
- Lecturer, Department of Communication, Istanbul Bilgi University, Istanbul, 2008-2011.
- Teaching Assistant, Department of Communication, Istanbul Bilgi University, Istanbul, 2007-2008.

PUBLICATIONS:
- Ursavaş, B. & Hesapçı-Sanaktekin, Ö. (2011, forthcoming). Effects of Dramatic Contrast on Memory and Temporal Perception: What Happens to Consumers When They are Lost Between Happiness and Sadness?

- Ursavaş B. & Yıldırım, P. (2011, forthcoming). The Effect of Ad Repetition on Consumer Memory Reconstruction.

- Hesapçı-Sanaktekin, Ö. & Ursavaş, B. (2011). The Role of Self-Esteem in the Persuasive Effects of Emotional Valence Sequence. In the Proceedings of the 10th International Marketing Trends Congress, January 20-22, Paris.

- Ursavaş B. & Yıldırım, P. (2009). A Conjoint Analysis on the Determinants of Viewer Choice of TV Programming. In the proceedings of 7th Annual International Conference on Business: Accounting – Finance –Management –Marketing, July 6-9, Athens.

To the artist who still resists

CONTENTS

TABLES

PART ONE

PART TWO

FIGURES

PART ONE

PART TWO

OVERTURE

"Music is the one incorporeal entrance into the higher world of knowledge, which comprehends mankind but which mankind cannot comprehend."
(Ludwig van Beethoven)

Music is an integral aspect of human culture. Whether we listen to a symphony from a majestic orchestra or hum a simple melody while walking on the street, music penetrates deep into our souls, and connects us with a higher, emotional realm. Music may be one of the most ancient forms of human communication (Geissmann, 2000). Historical evidence suggests that the origins of music extend back to the Paleolithic age, almost forty thousand years into the past (Kunej & Turk, 2000). However, it would not be preposterous to imagine that music has been with us since the dawn of humanity. As Darwin wrote "... it appears probable that the progenitors of man, either the males or females or both sexes, before acquiring the power of expressing their mutual love in articulate language, endeavoured to charm each other with musical notes and rhythm." (Darwin, 1871). As a communication tool, music is so powerful that it creates a universal language, and unites complete strangers around common emotions and ideas. As Jimi Hendrix once argued, music may be our only chance to make a real change in this world.

The ability of music to influence human emotions and behavior has attracted the attention of advertising practitioners since the early twentieth century. Music took its big leaps into advertising first with radio in the 1930s,

and then with television in the 1950s (Kellaris et al., 1993). Today, however, music has gone beyond being an executional advertising element, and become a ubiquitous aspect in the everyday-lives of modern consumers. Whether they wait for service in a bank queue, shop in a supermarket, or attend to media at home, consumers are surrounded by music (Kellaris, 2008). Music penetrates into almost all consumption contexts, and shapes consumers' experiences profoundly.

Research Objectives

The pervasiveness of music in consumers' lives makes it a very relevant phenomenon for consumer research. Understanding how music affects individual and collective consumer behavior may have substantial societal and managerial implications. Not surprisingly, consumer research has increasingly invested scholarly attention on music since the early work of Smith and Curnow (1966). So far, we have discovered a great deal about music's influence on consumers. Nevertheless, what we don't know still exceeds what we have learned.

The present dissertation aims to contribute to our understanding of music's influence on consumers. With two experiments, it attempts to produce genuine knowledge about the psychological mechanisms through which music influences consumers' memory, attitudes and temporal perceptions. It is greatly hoped that the present dissertation will advance the state of the art in music-related consumer research.

First Experiment

The objective of the first experiment is to investigate the effects of music on consumers' temporal perceptions. More specifically, it explores how music, through tempo and rhythm, influences and shapes individuals' judgments on the duration of stimulus events. This experiment contributes to music-related time perception research in multiple aspects. For instance, for the first time in the literature, musical rhythm is operationalized as an experimental variable. The study not only successfully operationalized musical rhythm, but also documented its effect on time perception. The study also found empirical evidence on the relationship between time perception and tempo, a nascent experimental variable in this research stream. Furthermore, empirical evidence is documented on the effects of tempo – rhythm interaction, which is a previously unexplored relationship. Finally, this investigation is distinct from the vast majority of related research in that it employed digital technology to maintain experimental control over the confounding effects of structural elements that reside within the nature of music. Music-related research has only very recently begun to use this technology as a methodological tool, which contributes greatly to the internal validity of findings.

Second Experiment

The second experiment mainly deals with how individuals' attitudes and memories are formed in response to ads that contain conflicting music and

message emotions. Furthermore, it also explores how the experience of conflicting emotions influences consumers' time perceptions. The study provides a genuine contribution to consumer research in various respects. First, the construct dramatic contrast is proposed to define the specific type of emotional ambivalence that results from conflicting background music and ad message emotions. Drawing a demarcation line between dramatic contrast and other types of emotional ambivalence is important because the former involves evoking emotional conflict through auditory cues, whereas the latter works through visual cues. These two different types of cues may activate different cognitive and affective mechanisms that result in the experience of emotional ambivalence. Therefore, the term dramatic contrast is introduced into the literature to make a clear distinction between different types of emotional ambivalence. A second contribution of this study is that, for the first time in the emotional ambivalence literature, music is used as an independent variable to operationalize emotional ambivalence. In this respect, this study also sets a unique methodological example for future investigators as to how music can be used as an experimental variable in designing emotional ambivalence research. Lastly, this experiment extends the current state of emotional ambivalence research by introducing the literature with a novel dependent variable, time perception. Given the value of time in exchange relationships, consumer research should investigate the topic of time perception on a wider domain. This study documents empirical evidence on the relationship between dramatic contrast and time perception.

It is hoped that, with these two experiments, the present dissertation will further the frontiers of music-related consumer research.

PART I

INFLUENCE OF MUSICAL TEMPO AND RHYTHM ON CONSUMERS' TEMPORAL PERCEPTIONS

CHAPTER I

INTRODUCTION

"To stop the flow of music would be like the stopping of time, incredible and inconceivable." (Aaron Copeland)

Perhaps, one of the most magnificent qualities of music is its ability to influence listeners' time perceptions. Although time is an objectively measured physical property, music can bend time, and make its passage subjectively experienced as being faster or slower. Research suggests that perceived time is a function of changes in external stimuli and internal states experienced during a particular time interval (Zakay & Block, 1994). More specifically, physical time interval of a stimulus event can be perceived differently under different physical and psychological states. Given that music is a powerful agent that influences affective and cognitive mechanisms, it may, therefore, influence individuals' perceptions of time.

The subjective experience of time has important implications for marketers. Modern day consumers are in constant scarcity of time and, therefore, regard it as a very valuable asset. Given that consumers often sacrifice their time in the form of experiencing delays, waiting for service, spending time to search for product information and to shop, it is possible to conceptualize time as a significant component of the total cost of these transactions (Kellaris & Kent, 1992). Thus, a possible way to minimize the cost of time for consumers is to manipulate their perceptions of it by controlling the

properties of external stimuli that surround and influence them. In fact, music is such an external stimulus and, therefore, it can be used for this purpose effectively (Kellaris & Kent 1992).

CHAPTER II

LITERATURE REVIEW

Temporal Perception

The notion of time (temporal) perception refers to an individual's time-related experiences, behaviors, and judgments (Block & Zakay, 2001). It includes such temporal experiences as (1) duration (interval length) estimates, and (2) subjective speed of time passage (Sucala, et al., 2011). Subjective speed of time passage refers to the perceived pace with which time passes (Wearden, 2005). Duration estimate is defined as an estimation of a temporal interval length (Sucala, et al., 2010). Although literature on time perception has generated research on both subjective speed of time passage, and duration estimates, much of the research effort is centralized around the latter topic (Block, 1990).

Research on time perception has produced a number of contradictory findings as to how duration estimates are formed. For instance, a body of empirical evidence suggests that estimates on the duration of an event become longer when the event is filled with an information processing task than when it is empty (Ornstein, 1969; Thomas & Brown, 1974; Boltz, 1991). However, the literature has witnessed other studies (Zakay, Nitzan & Glicksohn, 1983) that report just the opposite. Furthermore, a group of investigations (Ornstein, 1969; Thomas & Brown, 1974; Boltz, 1991) suggests a positive relationship between the amount of information to be processed from an event,

and the magnitude of duration estimates about it. Conversely, some research (Curton & Lordahl, 1974; Grondin & Macar, 1992; McClain, 1983; Zakay, 1989) suggests a negative relationship between the same two variables (Zakay & Block, 1994).

The reason for this obvious contrast in findings is that time perception research is governed by two distinct experimental paradigms. Based on the researcher's point of view, human time perception can be investigated from either a prospective paradigm or a retrospective paradigm (Zakay, 1990). Research suggests that different cognitive mechanisms characterize prospective and retrospective duration estimates (Sucala, Scheckner, & David, 2011).

In the prospective paradigm, subjects are made aware that the experimental task involves estimating the duration of a stimulus (Zakay & Block, 1997). Cognitive research on prospective time perception has traditionally explained the phenomenon with attentional models (Zakay & Block, 1994). These models rely on the premise that time perception is a function of temporal and non-temporal information processing (Thomas & Weaver, 1975; Zakay, 1989; Zakay & Block, 1996). According to this framework, when required to make a prospective duration estimate, individuals divide their attentional resources between processing temporal (time-related) information, and non-temporal (task-related) information (Sucala, 2011). Due to capacity limitation (Kahneman, 1973), as a task demands more non-temporal information processing, less attentional resources are allocated for the processing of temporal information, which, in turn, results in experiencing a shorter duration (Zakay & Block, 1994). More specifically, as the difficulty of processing a task increases, experienced duration becomes shorter (Macar, Grondin, & Casini, 1994) because attention is focused more on processing non-

temporal stimuli than temporal stimuli. Therefore, attentional models of time perception predict a negative relationship between the amount of information to be processed from an event and the length of duration estimates (Zakay & Block, 1994).

In contrast to prospective time perception, the retrospective paradigm involves collecting subjects' duration estimates after the completion of a stimulus task (Zakay & Block, 1997). In this case, subjects are not aware that they will have to make a duration judgment at the end of the task. Hence, factors such as temporal time processing or task difficulty are not relevant in making retrospective duration estimates. Alternatively, this experimental paradigm mainly concerns subjects' remembrance of event durations (Kellaris & Mantel, 1996). Research suggests that, in the retrospective scenario, duration estimates about a stimulus event are based on the amount of information encoded and retrieved from the event (Ornstein, 1969, Block, 1990, Zakay & Block, 1996). Therefore, retrospective models predict a positive relationship between the amount of memory processed from a stimulus, and the magnitude of duration estimates about it. A classic model of retrospective time perception is Ornstein's (1969) storage-size model. The model posits that as individuals allocate larger memory space to a complex information processing load, their duration estimates expand.

Individuals generally do not pay close attention to the passage of time. When required to remember the duration of a stimulus, they rely on availability heuristic, which means that they perceive the duration as being longer if they can retrieve more memory about the stimulus (Block, 1990; Zakay & Block, 2004). Research also suggests that duration estimates are amplified when stimuli are novel (Tse, et al., 2004; Pariyadath & Eagleman, 2007), bigger (Ono & Kawahara, 2007; Xuan, et al., 2007),

faster (Brown, 1931), and brighter (Fraisse, 1963; Brigner, 1986; Xuan, et al., 2007). Furthermore, stimuli containing larger numerosity (Xuan, et al., 2007), more complex patterns (Roelofs & Zeeman, 1951; Schiffman & Bobko, 1974), and higher number of events (Poytner, 1989; Brown, 1995) are also perceived as occupying more temporal space.

Another key approach to retrospective duration estimate is the contextual-change model of time perception (Block & Reed, 1978; Block, 1990). This model contends that remembered duration of an event expands as a function of the amount of contextual changes encoded in memory (Zakay & Block, 1997). These contextual changes are characterized by both (1) external changes related to the stimulus event, and (2) internal changes related to the individual. Internal changes may stem from changes in meanings, cognitive strategies, or states of mood (Zakay & Block, 1994). In general complex stimuli involve more contextual changes because they demand more varied kinds of processing (Zakay & Block, 1997). As Poytner (1983) points out, each of these contextual changes creates a meaningful segment in a given time period. As the processing load of an event becomes heavier, the level of time segmentation increases. As a result, individuals remember a multi-segment time period as being longer than an unsegmented time period (Zakay & Block, 1997). The same argument holds also for filled versus empty time intervals (Zakay & Block, 1994), where a filled interval means a heavier information processing load due to the occurrence of more changes (segments).

To summarize, human time perception depends on whether the duration judgment is made prospectively or retrospectively. In the prospective paradigm,

individuals estimate the duration of a complex task as being shorter because less attentional resources are devoted to the processing of temporal information. Alternatively, in the retrospective paradigm, individuals report longer duration estimates for complex tasks because their duration judgments are based on the amount of task-related information encoded in memory (Zakay & Block, 1997).

The present study adopts the retrospective time perception approach because consumers, in general, do not pay attention to time cues very often (Sucala, 2011), and, therefore, subsequent evaluation of a consumer experience may be based more on the remembrance of its duration than the experience of it (Kellaris & Mantel, 1996, Oakes, 2003).

Music-related Consumer Research on Temporal Perception

The notion of temporal perception has received considerable research attention in the music-related consumer behavior literature. The literature mainly deals with musical influences on various time-related dependent variables, such as consumer attitudes and perception.

For instance, Milliman (1982) manipulated tempo in a supermarket setting, and found the speed of in-store traffic to be significantly slower with slower music than with faster music. The author also observed a significant negative relationship between tempo and sales volume, such that sales volume was higher under slow music than fast music. In a consecutive study, Milliman (1986) used a restaurant setting to observe the behaviors of customers. The study reported that customers who listened to slow music

while eating spend a longer time to finish their meal. In two consecutive field studies, Chebat, et al. (1993) investigated the effects of positively versus negatively valenced music on perceived waiting durations. Findings suggested that positively valenced music increased perceived duration of the wait, but this effect did not influence approach behaviors negatively. A related study by Hui, Dube & Chebat (1997) suggested that subjects listening to liked-music perceived the wait time as being longer than those listening to disliked-music. However, similar to Chebat, et al. (1993) they posited that the perceived wait time did not have a negative effect on subjects' attitude toward the service. Similarly, Cameron, et al. (2003) reported that although liked music caused wait time to be perceived as being longer, it also evoked positive mood, which in turn positively affected subjects' evaluations of their service experience. Finally, Yalch & Spangenberg (2000) found that although subjects listening to familiar music shopped faster than those listening to unfamiliar music, they perceived the duration of shopping interval as being longer.

A Methodological Overview of the Music-related Temporal Perception Research

Music-related consumer research on time perception has accumulated a significant amount of scholarly work since the 1980s. However, the vast majority of these investigations share a simplistic conceptualization of music where musical sound is seen as a generic sonic mass. Music theory, on the contrary, suggests that musical sound is not a sonic chunk. Rather, music consists of a number of structural elements, which can basically be grouped as time, pitch, and texture (Bruner 1990). In other words, musical

sound can be thought of as being a complex combination of individual elements, where each element interacts with another.

This multidimensional (versus unidimensional) character of music should be carefully considered when using musical variables in a consumer research design. If not, interactions among structural musical elements may produce confounding effects, which in turn may cast doubt on the internal validity of the research. For instance, a common trait of the music-related consumer research that documented no tempo effects on time perception (Bickel, 1984; Caldwell & Hibbert, 2002; Chebat, et al., 1993; North et al., 1998) is that they simply manipulated musical tempo by using some form of music (e.g.,, classical compositions - popular songs, liked – disliked music), thereby ignoring the multidimensional nature of musical sound. More specifically, although musical tempo was the independent variable in these investigations, its effect was not isolated from the effects of other musical elements. The internal validity of these investigations is questionable because it is quite possible that their findings were confounded by the main or interaction effects of other musical variables (e.g.,, rhythm, phrasing, pitch, texture, etc.) (Oakes, 2003).

An effective way of solving this methodological problem is to use digital music technology. Because this technology enables researchers to manipulate each independent musical variable in isolation from others, it provides a more static-free experimental environment. Interestingly music-related consumer research on time perception has witnessed only a few investigations (Kellaris & Altsech, 1992; Kellaris & Kent, 1992; Kellaris & Mantel, 1996; Oakes, 1999, 2003; Oakes & North, 2006) that employed digital technology. In all of these studies, the independent variables at hand were

digitally manipulated in isolation from other musical variables. As a result, findings of these investigations are optimally clear of confounding effects. However, the scarcity of such studies remains a problem for the music-related time perception research. The literature obviously needs more such investigations to provide a better understanding about the relationship between music and time perception. The present study was designed as an attempt in this direction.

Taxonomy of Main Musical Variables

Before moving further, it is necessary to provide some detail as to the multidimensional nature of music. Otherwise, it may be difficult to follow the present study for those who do not have musical background.

Since Bruner's (1990) seminal work, the music-related consumer research has produced a number of investigations that acknowledged the multidimensionality of musical sound (Kellaris & Kent 1991, 1992, 1994; Kellaris & Rice 1993; Kellaris, et al., 1993; Kellaris & Mantel 1994, 1996; Oakes 1999, 2003; Oakes & North, 2006). As previously explained, the fundamental demarcation between these studies and others is that the former group of studies enjoys a better control over research variables through digital manipulation of musical elements.

In a seminal review article on music and mood, Bruner (1990) borrowed insights from music theory, and proposed a taxonomy of structural musical elements. The taxonomy defined musical sound in terms of three basic musical elements, namely time (characterized as tempo, rhythm, and phrasing), pitch (characterized as mode, melody,

and harmony), and texture (characterized as volume, timbre, and orchestration). Bruner suggested that music should be seen as a chemistry of these compounds, and that emotional responses to music depend largely on their main and interactive effects.

In another seminal work, Kellaris & Kent (1994) proposed a similar taxonomy in which music was characterized in terms of tempo, tonality, and texture. Different from Bruner (1990), however, Kellaris & Kent (1994) also designed an experimental study to document the main and interaction effects of musical elements on a number of emotional responses. Findings of this seminal work are discussed in the following sections.

Pitch Characteristics

Bruner (1990) identified pitch-related characteristics as mode, melody, and harmony. Melody refers to the succession of notes occurring over time throughout a particular piece of music. While melody concerns the succession of notes played over time, harmony deals with how a particular combination of notes sound when played simultaneously. A given harmony can take consonant or dissonant forms. Music research reveals that consonant harmonies are generally associated with playful, happy or serene meanings, whereas dissonant harmonies are perceived as being sad and agitating (Bruner 1990). In terms of their psychological effects, melody and harmony are the two less investigated subdimensions of pitch.

Mode refers to the configuration of intervals between pitches in a scale (Apel, 1969). It provides the tonal substance of music, and it greatly contributes to its emotional character (Hevner, 1937). The two most commonly used musical modes are

the diatonic major and the diatonic minor. Especially in Western cultures, music in major mode is generally perceived as being happy and bright, whereas music played in minor mode is found to be sad, angry or mysterious (Bruner, 1990). In addition to these two most common diatonic modes, nondiatonic modes are also used widely in music. A common characteristic of nondiatonic musical modes is that they produce dissonant and out-of-tune-like sounds in untrained ears (Kellaris & Kent, 1994).

Texture Characteristics

Unlike pitch and time, musical texture has traditionally enjoyed less research attention (Kellaris & Kent, 1994). While Bruner (1990) defined texture in terms of timbre, orchestration, and volume, Kellaris & Kent (1994) operationalized texture as orchestration only. Timbre refers to the sound difference due to the objective characteristics (i.e., the material they are made of, whether they have strings or not) of musical instruments (Dowling & Harwood, 1986). For instance, woodwind instruments (e.g.,, clarinet, flute, oboe, etc.) are generally perceived as mournful and sad, whereas brass (e.g.,, trumpet, trombone, horn, etc.) instruments are characterized as majestic and proud, regardless of the music performed (Van Stone 1960).

Volume refers to the loudness of music. Finally, orchestration concerns how or which musical instruments are used in a musical composition (Kellaris & Kent 1994). For instance, Kellaris & Kent (1994) used classical and pop orchestrations to operationalize texture.

Time Characteristics

Time relates to the temporal dimension of music, which includes tempo, rhythm, and phrasing. Phrasing refers to the time interval a note sounds in comparison with the rhythmic period it occupies (Bruner, 1990). For instance, a staccato note sounds for only a small part of a bar, whereas a legato note is sustained until the beginning of the next note.

Tempo describes the pace of music, and it is characterized as the number of beats per minute (BPM). Although there is no consensus in the literature as to what BPM level accounts for fast or slow music, musical convention regards tempi with approximately 60 BPM as slow, and tempi with more than 120 BPM as fast (Kellaris & Kent 1991). Music studies concerning emotional responses to tempo have long established that faster tempi within music are generally associated with happy, aroused, and pleasant feelings, whereas slower tempi are found to produce feelings of calmness and tranquility (Gundlach 1935; Hevner 1937; Scherer & Osinsky 1977; Watson 1942; Wedin 1972).

Rhythm concerns the way in which one or more unaccented beats are organized with regard to one accented beat (Cooper & Meyer 1960). More specifically, rhythm describes the internal temporal organization of beats (and other sounds) within a musical piece. Although often confused with tempo, rhythm exists independent of musical tempo. For instance, a song can be played under a given tempo level with very different rhythms (e.g.,, reggae, rock or jazz). Although no taxonomy was proposed to categorize different rhythms (Cooper & Meyer 1969), the present research operationalized rhythm as “more rhythmic” and “less rhythmic”. In this sense, a more rhythmic music has

narrower temporal distance between each beat. On the other hand, a less rhythmic music has a wider temporal space between each beat.

Consumer Responses toward Main Musical Elements

Affective and Behavioral Responses

Consumer research involving the structural properties of music suggests that musical elements produce main and interaction effects on a wide variety of consumer responses. In their seminal work, Kellaris & Kent (1994) used a 3 (Mode: major, minor, atonal) x 3 (Tempo: fast, moderate, slow) x 2 (Texture: classical, pop) factorial design to explore the main and interaction effects of basic musical elements on pleasure, arousal, and surprise. The authors reported that pleasure was affected by the interactions of both mode and tempo with texture. More specifically, more pleasure was reported for music played in faster tempo and in consonant (major or minor) keys. However, this effect was significant only for classical (versus pop) music. The authors also suggested that arousal was affected by the interaction of tempo with texture. According to this finding, fast music was associated with higher arousal only for pop music. Finally, the authors documented that the level of surprise was greater when the music was played in atonal (versus tonal major or tonal minor) keys.

In another experimental study, Kellaris & Kent (1991) investigated the main and interaction effects of mode and tempo on a number of evaluative and behavioral intention measures. The authors reported that evaluations of, and behavioral intention

toward music were greater under faster tempo and more tonal music. Furthermore, tempo and mode were also found to have a positive influence on felt arousal from the music. Kellaris & Rice (1993) explored the influence of tempo, volume, and gender on a number of listener responses to music. A major finding of this research was the moderating role of gender on the relationship between musical volume and reactions to music. According to the authors, females generated less positive intentions and affective evaluations to music played in higher volume.

Duration Judgments

Music-related consumer research on time perception has witnessed only very few studies that digitally manipulated main musical elements. Kellaris & Kent (1992) reported a significant effect of mode on retrospective duration estimates. According to the findings, music in major mode (versus minor and atonal modes) positively influenced duration estimates, such that subjects who listened to this type of music reported longer estimates. Using insights from the cognitive models of psychological time, the authors proposed that higher duration estimates were a result of felt pleasantness from major modes, which motivated listeners to devote more cognitive resources on processing the music, rather than time. In another study, Kellaris & Altsech (1992) found that high (versus low) musical volume led female subjects to report longer duration estimates.

Literature review for the present study revealed only three studies (Oakes, 1999, 2003; Oakes & North, 2006) that investigated the influence of musical tempo on psychological time. A review of these investigations suggests that effect of tempo on

duration estimates may depend on the length of the time interval to be estimated. For instance, tempo was found to have no significant effect on duration estimates under short time intervals (40 seconds) (Oakes, 1999; Oakes & North, 2006). On the other hand, a significant effect was reported for longer durations (4 to 15 minutes) (Oakes, 2003).

The fact that tempo has received so little interest in time perception research is quite peculiar considering that tempo literally means time. However, what is as equally peculiar is that no study has ever attempted to investigate the influence of rhythm on temporal perception. Because musical tempo and rhythm are closely related variables, it is highly probable that they produce an interaction effect on consumers' time perceptions. The present study was designed to explore this relationship, thereby filling a significant gap in the music-related time perception literature.

CHAPTER III

HYPOTHESES

Cognitive models of retrospective time perception (Ornstein, 1969, Block, 1990, Zakay & Block, 1996), postulate a positive relationship between duration judgments and the amount of information processing. Furthermore, time perception research also suggests a positive relationship between duration estimates and complex stimulus characteristics (Brown, 1931; Xuan, et al., 2007; Roelofos & Zeeman, 1951; Schiffman & Bobko, 1974).

Music characterized with fast tempo (versus slow tempo) contains more data in the form of additional notes, beats, and bars (Oakes, 1999, 2003). For instance, a song contains twice as much musical information when it is played with 140 BPM rather than 70 BPM. The increased load of musical data implies a heavier processing task for the listener. From a retrospective time perception perspective, subjective time is expected to expand when information processing involves more complex, higher numerosity musical stimulus. Therefore, a faster tempo should have a direct positive effect on subjects' duration estimates.

Hypothesis 1: Subjects in the fast tempo (versus slow tempo) condition will report significantly longer duration estimates.

Music-related time perception research produced no studies investigating rhythm effects on duration estimates. However, music theory suggests that rhythm, just like tempo, is a structural element related to musical time (Bruner, 1990). As explained in the previous section, a given tempo can be expressed with very different rhythms. Hence,

the amount of temporal data contained in music may depend on a chosen rhythmic pattern. More specifically, more information has to be processed from music when tempo is expressed with a more complex (versus simple) rhythmic pattern. This should imply a direct positive effect of rhythm on duration estimates.

Hypothesis 2: Subjects exposed to more rhythmic (versus less rhythmic) music will report significantly longer duration estimates.

Because the load of musical data becomes heavier as tempo and rhythm gets faster, these two elements should also have an interaction effect on duration estimates. More specifically, the effect of rhythm should be more pronounced under fast (versus slow) tempo conditions.

Hypothesis 3: As tempo increases from slow (70 BPM) to fast (140 BPM) , subjects exposed to more rhythmic (versus less rhythmic) music will report longer duration estimates.

Music studies concerning emotional responses to tempo have long established that faster musical tempi are generally associated with happy, aroused, and pleasant feelings, whereas slower musical tempi are found to produce feelings related to calmness and tranquility (Gundlach 1935; Hevner 1937; Scherer & Osinsky 1977; Watson 1942; Wedin 1972). Similarly, music-related consumer research documented tempo effects on a number of dependent variables, such as behavioral intentions and affective responses (Kellaris & Kent, 1991, 1994; Oakes, 2003; Oakes & North, 2006), and arousal (Kellaris & Kent, 1994; Kellaris & Rice, 1993). Following the positive relationship between musical tempo and these dependent variables, a similar effect is also hypothesized for rhythm.

Hypothesis 4: Subjects in the fast tempo (versus slow tempo) condition will report higher levels of a) arousal, b) pleasantness, and c) behavioral intention.

Hypothesis 5: Subjects exposed to more rhythmic (versus less rhythmic) music will report higher levels of a) arousal, b) pleasantness, and c) behavioral intention.

Hypothesis 6: As tempo increases from slow (70 BPM) to fast (140 BPM), subjects exposed to more rhythmic (versus less rhythmic) music will report higher levels of a) arousal and b) pleasantness c) behavioral intention.

CHAPTER IV

RESEARCH DESIGN AND METHODOLOGY

Participants and Design

One hundred ninety six (μ_{age}= 21.29; 59.7% female) undergraduate students from a major Istanbul university participated the study. Undergraduate students were chosen as an appropriate sample for this study since individuals from this segment are heavy consumers of musical products. Subjects reported a high general attitude toward music (μ= 6.58) on a seven-point semantic differential scale ranging from (1) not at all interested to (7) very interested. The sample included no music majors or professional musicians. The mean level of formal music training was (μ= 1.90) on a seven-point scale ranging from (1) no training to (7) extensive training. Subjects were uninformed of the objectives of the study, and they were offered extra course credit as an incentive to participate in the study.

This study was designed to test the main and interaction effects of tempo and rhythm on subjects' duration estimates and on their affective responses. Tempo and rhythm were manipulated in a two (Tempo: fast, slow) by two (Rhythm: more rhythmic, less rhythmic) between subjects design. Original music was composed by the author to operationalize the independent variables. The procedure involved randomly assigning subjects to treatments, exposing them to musical stimulus, and asking them to complete a brief, self-administered questionnaire. Subjects were exposed to the treatment in small

groups in a classroom. The whole experimental procedure took about fifteen minutes to complete.

Stimuli Development

Original pop-style music was composed for the present study. The composition was written to mimic the type of music heard in commercial contexts. Four variations of the same musical composition were written to manipulate tempo and rhythm. Manipulation of musical variables was maximally controlled with the use of a professional music software, ProTools LE-8. Digital music technology enabled the researcher to manipulate each independent musical variable in isolation from others. This brought increased internal validity, since the observed effect was not confounded with noise. In this respect, the present study joins an exclusive group of investigations in the music-related time perception literature. The experimental music was composed in major mode and was played with instruments frequently used in pop music. No lyrics were present in the music.

Tempo was operationalized as fast (140 BPM), and slow (70 BPM). The choice for these tempo levels was based on musical convention and experience. A difficulty in manipulating tempo is that music in the slow tempo condition (70 BPM) seems to be twice as long as the music in the fast tempo (140 BPM) condition. This is because the slow tempo music is exactly twice as slow as the fast tempo music. This results in an apparent inconsistency in stimuli durations. As Oakes (1999) pointed out, difference in stimuli durations may have a confounding effect on the results. To protect the present

study from such a scenario, the duration of stimuli was fixed at fifty-five seconds. This was achieved by following Oakes' (1999) method, which involves using an experimental music that consists of four bars that repeat in a cycle.

Rhythm was operationalized as "more rhythmic" and "less rhythmic". Using music software, the distance between each beat was programmed to be twice as much in the more rhythmic condition. As a result, listeners in the more rhythmic condition heard a twice as much intense rhythm pattern as those in the less rhythmic condition. To maintain ease-of-listening, especially in the "fast tempo x more rhythmic" condition, the present study avoided complex rhythm patterns and used a simple, even rhythm of four beats in a measure (4/4 time).

Dependent Variables

Perceived Duration

Time perception research traditionally measures subjects' duration estimates by using blank spaces with "minutes" and "seconds" labels (Block, 1990; Fraisse, 1984; Levin & Zakay, 1989, Kellaris & Mantel, 1994, 1996; Kellaris & Altsech, 1992). However, this method has a shortcoming since it may encourage respondents to round up their duration estimates (Oakes, 1999, 2003). Following prior research (Oakes, 1999, 2003) the present study measured subjects' duration estimates by asking them to mark a number from a table that included numbers ranging from 1 to 180. The instructions read: "Please indicate the duration (in terms of seconds) of the music you have just heard. Try to be as precise as possible even if you are not sure."

Felt Arousal

The level of felt arousal from the music was measured with a five item, seven-point semantic differential scale adapted from Kellaris & Kent (1991) (α= .824). Items included not lively (1) - lively (7); not arousing (1) - arousing (7); not energetic (1) - energetic (7); not exciting (1) - exciting (7); and not loud (1) - loud (7).

Affective Evaluation

The affective evaluation scale was composed of four seven-point semantic differential items preceded by the prompt "The music I heard was ..." (adapted from Kellaris & Kent, 1991). The items included unpleasant (1) - pleasant (7); unappealing (1) - appealing (7); ugly (1) - beautiful (7); and unlikeable (1) - to likeable (7) (α= .945).

Mood

A four-item, seven-point semantic differential mood scale was included in the survey to explore how the music made subjects feel. The scale was preceded by the prompt “The music I heard made me feel…” The items, adapted from Kellaris & Mantel (1994) (α= .939), included bad (1) - good (7); unpleasant (1) - pleasant (7); sad (1) - happy (7); negative (1) - positive (7)

Intention toward the Music

Subjects reported their intention to listen to the music by giving a yes / no answer to the question "if given the chance, would you like to listen to the music one more time?"

General Purchase Intention

Although no hypothesis was produced on the relationship between time-related musical elements and subjects' general purchase intentions, an intention to purchase scale was added to the questionnaire for exploratory reasons. For this purpose, subjects were asked to report their purchase intentions toward a hypothetical cellular phone brand on a four item, seven-point scale (α= .831). Items included I would not try (1) - (7) try this product; I would not buy (1) - buy (7) this product; it is not likely (1) - likely (7) that I buy this product; I would not recommend (1) - recommend (7) this product to others.

Other Measures

The questionnaire also included demographic measures asking subjects' age, gender, global attitude toward music, and the level of formal music training.

CHAPTER V

DATA ANALYSES AND FINDINGS

Manipulation Checks

As previously discussed in the stimulus development section, tempo and rhythm were manipulated using music software ProTools LE-8. In the slow tempo condition, musical tempo was set to 70 BPM. In the fast tempo condition, musical tempo was set to 140 BPM. As a result of this process, fast tempo music was exactly double the speed of slow tempo music. In order to check whether the difference in tempo levels was easily recognized, subjects were asked to judge the fastness of music on a seven-point scale (1 = very slow, 7 = very fast). ANOVA results revealed a significant mean difference between fast ($\mu = 5.8$) and slow ($\mu = 3.46$) tempo music ($F_{1, 194} = 245.965$; $p < .001$).

As for the rhythm manipulation, the number of beats in the more rhythmic condition was programmed to be double the number of beats in the less rhythmic condition. To make sure that difference between the two rhythmic patterns was easily perceived, subjects were asked to rate the "rhythm that the percussionist played in the song. Responses ranged from the rhythm was played very slowly (1) to the rhythm was played very fastly (7)". As expected, analysis provided a significant mean difference between less rhythmic ($\mu = 3.43$) and more rhythmic ($\mu = 5.06$) conditions ($F_{1, 194} = 75.496$; $p < .001$). All together, the results confirmed that both tempo and rhythm manipulations were done successfully.

Hypotheses Testing

MANOVA

Significant intercorrelations were expected between perceived duration and felt arousal, since these two dependent variables are theoretically related. As expected, a significant positive correlation was observed. Furthermore, perceived duration was also found to correlate with affective evaluations of music. Finally, a highly significant correlation was observed between arousal and affective evaluations of music.

Table 1. Pearson Correlation Coefficients

	Duration Est.	Arousal	Affective Eva.	Purchase Int.
Duration Est.	1 196			
Arousal	.140* .05 196	1 196		
Affective Eva.	-.136* .057 196	-.247** .000 196	1 196	
Purchase Int.	.020 .785 196	.041 .572 196	.005 .941 196	1 196

In order to reduce Type I error, a multivariate analysis of variance (MANOVA) was performed on the intercorrelated variables. As hypothesized, MANOVA revealed significant main effects of musical tempo and rhythm. Analysis revealed that tempo had a significant main effect on duration estimates ($F_{1, 192}$= 11.058; p= .001) and arousal ($F_{1, 192}$= 89.937; p< .001). Furthermore, a marginally significant effect was also present on

affective evaluations ($F_{1, 192}$= 3.420; p= .066) (Wilk's Lambda= .580). Rhythm had a significant main effect on arousal only ($F_{1, 192}$= 22.535; p< .001) (Wilk's Lambda= .828). MANOVA revealed no interaction effects of tempo and rhythm on any of the dependent variables.

Table 2. MANOVA Results for Tempo and Rhythm

Independent Variable	Dependent Variable	Wilk's Lambda	F	df	p<
Tempo	Duration Est.	.580	34.207	1, 192	.001
	Arousal				
	Affective Eva.				
	Purchase Int.				
Rhythm	Duration Est.	.828	9.824	1, 192	.001
	Arousal				
	Affective Eva.				
	Purchase Int.				
Tempo x Rhythm	Duration Est.	.966	1.684	1, 256	n.s.
	Arousal				
	Affective Eva.				
	Purchase Int.				

ANOVA

Following the MANOVA findings on the effects of tempo and rhythm, a series of univariate analysis of variance (ANOVA) were performed to further investigate the relationships.

Retrospective Duration Estimates

Estimates on the duration of music averaged 61.37 seconds, which implies an overestimation of duration across the sample. As hypothesized, analysis of variance (ANOVA) revealed that tempo generated a statistically significant main effect on duration estimates ($F_{1, 192}$= 11.058; p< .01). As tempo increased from slow to fast, subjects' duration estimates expanded (μ= 55.30, μ= 67.19, respectively). More specifically, while subjects who listened to slow music remembered the duration with close proximity (actual duration was 55 seconds), subjects who listened to fast music perceived the duration as being (12 seconds) longer. Therefore, H1 was supported. The rhythm pattern of music, whether the music was more or less rhythmic, did not produce a significant main effect on duration estimates ($F_{1, 192}$= 2.852; p= .09). Hence, H2 was rejected. Similarly, interaction of tempo and rhythm also did not generate a significant effect on perceived duration ($F_{1, 192}$= 1.30; p= .25).

Table 3. ANOVA for Tempo and Rhythm Effects on Perceived Duration

Dependent Variable	Main and Interaction Effects	F	df	p=
Duration Est.	Tempo	11.058	1, 192	.001
	Rhythm	2.852	1, 192	.093
	Tempo x Rhythm	1.309	1, 192	.254

However, planned comparisons (a priori tests) revealed that in the fast tempo condition, rhythm had a significant effect on perceived duration ($F_{1, 98}$= 3.79; p= 0.05). Duration estimates were amplified in fast music as the rhythm got more rhythmic (μ= 72.41) than less rhythmic (μ= 62.18). Planned comparisons revealed no significant main effect of rhythm in the slow tempo condition ($F_{1, 94}$= 0.159; p< 0.69). However, mean difference between the more rhythmic (μ= 56.27) and the less rhythmic (μ= 54.30) conditions was of expected direction. To summarize, planned comparisons revealed that tempo moderated the effect of rhythm on retrospective duration estimates. Hence, H3 was supported.

Table 4. Planned Comparisons for Fast and Slow Tempo Conditions

Tempo	Rhythm	F	df	p=	Mean Duration Est.
Fast	Less Rhythm	3.79	1.98	.05	62.18
	More Rhythm				72.41
Slow	Less Rhythm	.16	1, 94	.69	54.20
	More Rhythm				56.27

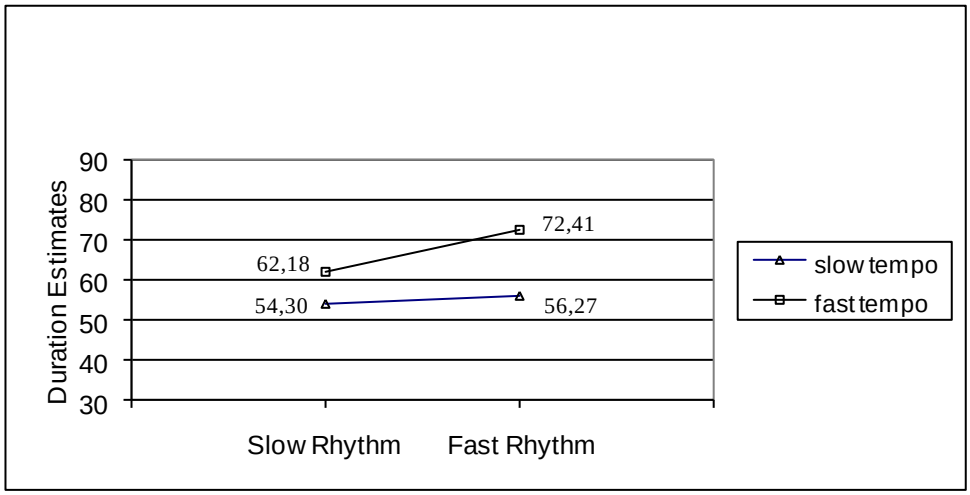

Fig. 1. Interaction of tempo with rhythm on duration estimates

ANCOVA

Because a significant correlation was observed between perceived duration and arousal (r= .140; p= .05), an ANCOVA was performed to better measure tempo and rhythm effects on duration estimates. However, the analysis revealed that arousal, as a covariate, did not significantly predict perceived duration ($F_{1, 191}$= .008; p = .928). ANCOVA revealed similar results for a number of other covariates, such as age ($F_{(1, 191)}$ = .392, p = .532), mood ($F_{(1, 191)}$=2.81, p =.095), and affective evaluation of music ($F_{(1, 191)}$= 1.756, p = .187).

Table 5. ANCOVA for Arousal

Dependent Variable	Main and Interaction Effects	F	df	p=
Duration Est.	Tempo	7.780	1, 191	.006
	Rhythm	2.634	1, 191	.106
	Arousal	< 1	1, 191	.928
	Tempo x Rhythm	1.246	1, 191	.266

Felt Arousal, Affective Evaluation of Music, and Behavioral Intentions

Felt Arousal

ANOVA revealed a tempo main effect on arousal ($F_{1, 192}$= 89.737; p< .001), such that subjects felt higher levels of arousal from the music as tempo increased from slow (μ= 3.34) to fast (μ= 4.9). This finding is in line with previous research (Bruner, 1990; Kellaris & Kent, 1994), which suggests a positive relationship between fast music and felt arousal. Rhythm also generated a main effect on felt arousal ($F_{1, 192}$= 22.535; p< .001). Just like tempo, faster rhythm was associated with higher levels of felt arousal (μ= 3.76, μ= 4.51, respectively). Findings also revealed an interaction effect of tempo and rhythm ($F_{1, 192}$= 4.052; p= .046), such that faster rhythm produced higher levels of arousal when tempo was faster. Therefore, Hypotheses H4a, H5a and H6a were supported.

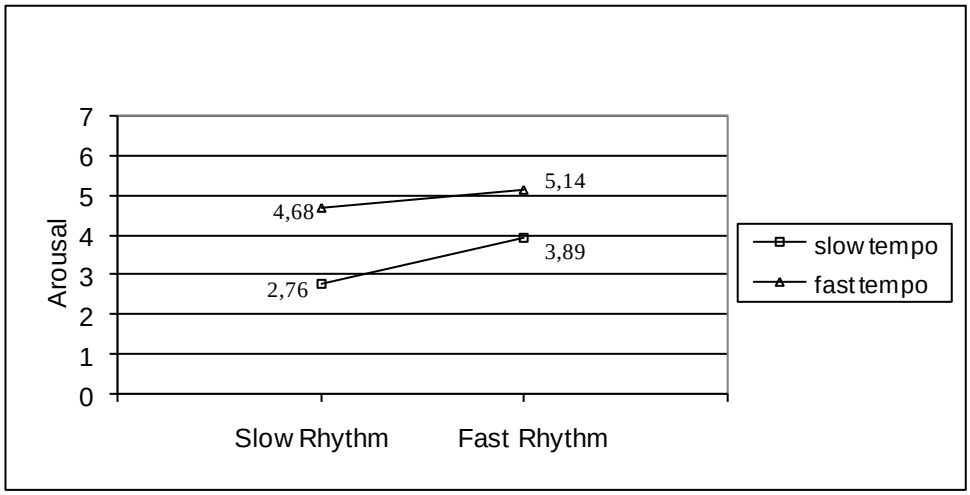

Fig. 2. Interaction of tempo with rhythm on felt arousal

Affective Responses

Music studies concerning emotional responses to tempo have long established that faster tempi are generally associated with more positive evaluations (Gundlach 1935; Hevner 1937; Scherer & Osinsky 1977; Watson 1942; Wedin 1972; Kellaris & Kent 1994). In contrast to this research insight, however, findings of the present study revealed a marginally significant negative main effect of tempo on subjects' affective evaluations of music ($F_{1, 192}$= 3.42; p= .06). Subjects generated more positive music evaluations as tempo decreased from fast (μ= 4.02) to slow (μ= 4.45). More specifically, although tempo generated a significant main effect on subjects' evaluation of music, direction of the effect was opposite of what was hypothesized. Therefore, Hypothesis H4b was not supported. In terms of rhythm effects, findings revealed no significant main effects ($F_{1, 192}$= .855; p= .35) of rhythm on subject' evaluations. Furthermore, no interaction effect

of tempo and rhythm was found either ($F_{1, 192}$= 2.092; p= .15). Therefore, Hypothesis H5b and H6b were rejected.

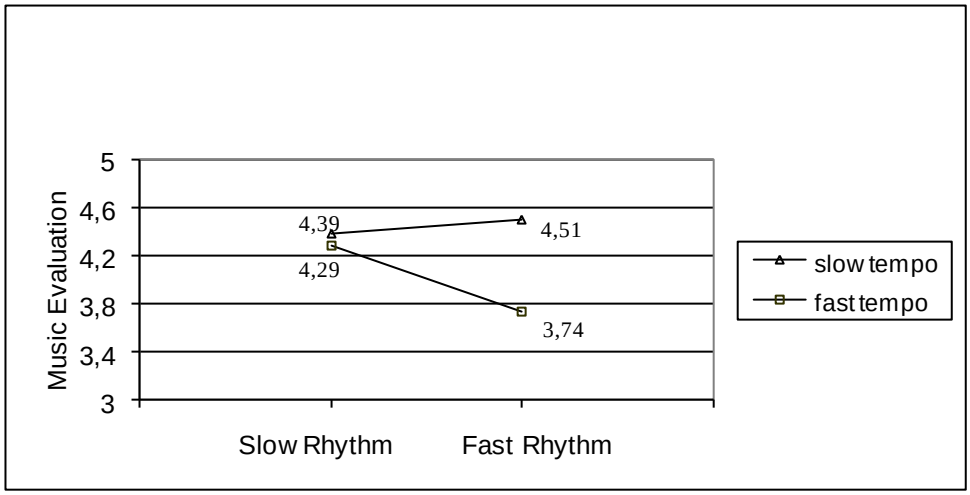

Fig. 3. Interaction of tempo with rhythm on affective music evaluation

Subjects were also asked to report how tempo and rhythm affected their mood. Findings revealed significant main effects neither for tempo ($F_{1, 192}$= 1.016; p= .315) nor for rhythm ($F_{1, 192}$= 1.816; p= .179). However, a significant interaction effect was found ($F_{1, 192}$= 4.37; p= .038), such that subjects in the fast tempo condition reported a more positive mood when the music was less rhythmic (μ= 5.31) rather than more rhythmic (μ= 4.62).

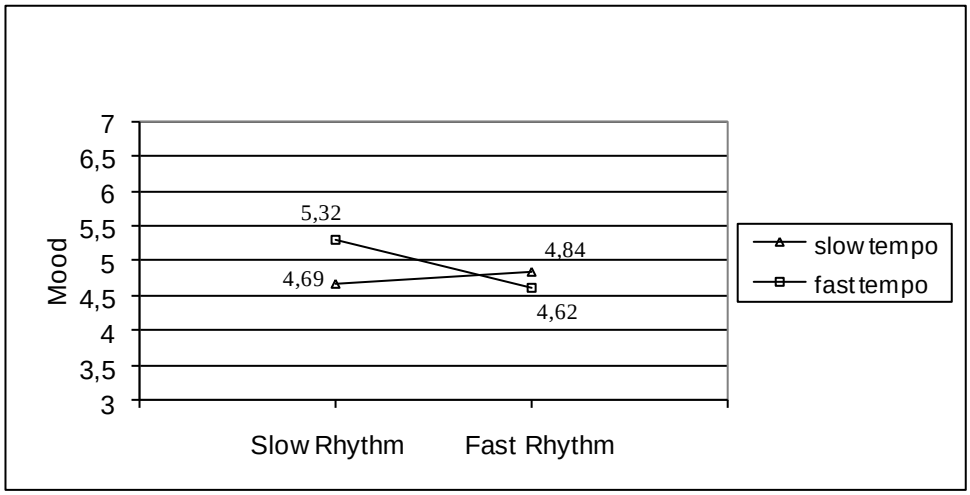

Fig. 4. Interaction of tempo with rhythm on mood

Intentions toward the Music, and General Purchase Intentions

ANOVA findings revealed no significant tempo ($F_{1, 192}$= 2.08; p= .151) or rhythm ($F_{1, 192}$= 3.189; p= .76) main effects on behavioral intention toward music. Therefore, H4c and H5c were rejected. Furthermore, no significant interaction effect of tempo and rhythm was found either ($F_{1, 192}$= 2.46; p= .118). Hence, H6c was also rejected.

In terms of general purchase intentions, ANOVA findings revealed no significant effect of tempo ($F_{1, 192}$= .872; p= .352) or rhythm ($F_{1, 192}$= 1.102; p= .295). Moreover, no interaction effect of tempo and rhythm was found either ($F_{1, 192}$= 2.797; p= .096).

Table 6. Summary of ANOVA Results

Dependent Variable	Main & Interaction Effects	F	df	p<
Temporal Perception	Tempo	11.05	1, 192	.01
	Rhythm	2.83	1, 192	n.s.
	Tempo x Rhythm	1.3	1, 192	n.s.
Arousal	Tempo	3.42	1, 192	.001
	Rhythm	<1	1, 192	.001
	Tempo x Rhythm	2.09	1, 192	.05
Music Evaluation	Tempo	3.42	1, 192	= .06
	Rhythm	<1	1, 192	n.s.
	Tempo x Rhythm	2.09	1, 192	n.s.
Mood	Tempo	1.06	1, 192	n.s.
	Rhythm	1.81	1, 192	n.s.
	Tempo x Rhythm	4.37	1, 192	.05
Music Intention	Tempo	2.08	1, 192	n.s.
	Rhythm	3.18	1, 192	n.s.
	Tempo x Rhythm	2.46	1, 192	n.s.
Purchase Intention	Tempo	<1	1, 192	n.s.
	Rhythm	1.1	1, 192	n.s.
	Tempo x Rhythm	2.79	1, 192	n.s.

CHAPTER VI

DISCUSSION, IMPLICATIONS AND LIMITATIONS

Discussion of Results

Temporal Perception

Previous research found that tempo to has a significant effect (Oakes, 2003), no effect (Oakes & North, 2006), or only a marginal effect (Oakes, 1999) on duration Estimates. This seeming inconsistency in findings may have stemmed from a number of reasons. First, in the two studies that did not report significant tempo effects (Oakes, 1999; Oakes & North, 2006), subjects were asked to generate duration judgments regarding brief time intervals (40 seconds). The length of time interval may be a factor in duration estimates, since a significant tempo effect was observed (Oakes, 2003) for longer durations (4 – 15 minutes).

Another possible reason for the inconsistency may have stemmed from the contextual characteristics of the stimulus time interval. For instance, in the studies that reported no tempo effect on time perception (Oakes, 1999; Oakes & North, 2006), subjects were required to estimate the duration of ads appeals. Alternatively, in the Oakes (2003) study, subjects estimated the duration of a waiting interval. It is possible that musical tempo may have different effects on time perception under different stimulus contexts.

A final reason for the disagreement in findings may have originated from the use of high BPM levels for tempo manipulations. In the three aforementioned studies, slow

and fast tempo conditions were manipulated within the ranges of (90 BPM – 130 BPM) and (104 BPM – 179 BPM), respectively. The representativeness of these tempo levels is questionable since it is unusual to hear music faster than 120 BPM in retail settings (Kellaris & Kent, 1992).

The present study provides support for the hypothesis that musical tempo can influence consumers' temporal perceptions. More specifically, it is found that consumers listening to faster music (versus slower music) remember the duration of the stimulus event as being longer. This finding provides an empirical support for Oakes (2003) who documented a significant tempo effect on duration estimates for longer time intervals. However, the present study differentiates itself from Oakes (2003) by observing tempo effects under shorter durations (55 seconds). This finding implies that tempo affects consumers' duration estimates not only under longer time intervals, but also under shorter durations. The present study is also different from Oakes (1999, 2003) and Oakes & North (2006) in that it documented a significant tempo effect on duration estimates under more conventional tempo levels (70 BPM, 140 BPM). This implies that musical tempo influences time perception not only under faster tempo levels, but also under slower tempo levels.

The present study is unique in documenting rhythm effects on time perception. Findings suggest that at a given tempo level, more rhythmic music is perceived as being faster than less rhythmic music. This perceived fastness of music results in a distortion in the experience of time. According to the findings, as the music gets more rhythmic, individuals report longer duration estimates, especially under fast tempo levels. A similar effect also occurs under slow tempo levels, although the effect is marginally

significant. This implies that the effect of rhythm on retrospective duration estimates is moderated by musical tempo. Higher musical tempo levels underlie the influence of rhythm on consumers' time perceptions.

To summarize, findings of the present experiment imply that higher levels of musical tempo and rhythm can cause a temporal illusion, where consumers experience time intervals as being longer than they actually are. These findings provide support for the cognitive models of retrospective time perception (Ornstein, 1969, Block, 1990, Zakay & Block, 1996), which postulate a positive relationship between duration judgments and the amount of information to be processed from the event. Furthermore, these findings also support the research, which suggests a positive relationship between duration estimates and stimuli characterized by faster (Brown, 1931), higher numerosity (Xuan, et al., 2007), and more complex patterns (Roelofos & Zeeman, 1951; Schiffman & Bobko, 1974).

Fast tempo music, compared to slow music, contains more data in the form of additional notes, beats, and bars (Oakes, 1999, 2003). For instance, a piece of music played with 140 BPM contains exactly twice as more information as when it is played with 70 BPM. In addition, rhythm can increase this data load since it is possible to express a given musical tempo with more (or less) complex rhythm patterns. This increased load of musical data implies a heavier processing task for the listener. In such a scenario, listeners are required to process a more complex, higher numerosity musical stimulus. As a result of this processing, subjective time seems to expand, and create an illusion through which individuals report longer duration estimates.

Subjective Evaluations of Music, Felt Arousal, and Behavioral Intention

The present study failed to provide support for the hypothesis that tempo has a positive effect on affective responses toward the music. Findings suggest a main tempo effect, however, direction of the relationship is negative. This means that higher musical tempi produce less positive affective evaluations of music. Although this finding seems to contradict previous literature (Gundlach 1935; Hevner 1937; Scherer & Osinsky 1977; Watson 1942; Wedin 1972; Kellaris & Kent 1994), it can be explained in methodological terms. The present study manipulated tempo and rhythm in isolation from other musical variables, such as mode and texture. More specifically, other than temporal and rhythmic differences, the experimental music was identical in all aspects. Music research has long established a strong positive relationship between mode and music pleasantness (Bruner, 1990; Kellaris & Kent, 1994). For instance, while music in major modes is associated with higher pleasantness, music in minor modes generates sad and mournful feelings (Bruner, 1990). In the present study, keeping musical mode and melody constant across different tempo and rhythm levels may have generated a general dislike among the subjects. An alternative design that manipulates musical mode along with tempo and rhythm may generate very different results. An additional (or alternative), explanation may be that because stimulus durations were fixed across all conditions, subjects listening to fast and more rhythmic music had to hear the same bars twice as more, as fast, and as intense as other experimental subjects. It is quite possible that the musical stimulus sounded more tiring and monotonous to subjects in the fast music conditions. As a result of this negative listening experience, subjects may have

reported less positive affective responses toward the music. Therefore, it may be somewhat normal to find a negative effect of fast tempo on music evaluation.

As for arousal, findings support the hypothesis that tempo, rhythm, and their interaction have a significant effect on arousal. It is evident that faster music and more rhythmic patterns lead individuals to experience higher levels of arousal. This finding is consistent with previous research (Gundlach 1935; Hevner 1937; Scherer & Osinsky 1977; Watson 1942; Wedin 1972, Kellaris & Kent, 1994), which suggests that faster tempi in music are generally associated with aroused feelings, whereas slower tempi produce feelings related to calmness and tranquility.

The results suggest no tempo or rhythm effect on consumers' mood, although an interaction effect was present. The effect implies that consumers listening to fast music develop a more positive mood when the music is less rhythmic. The literature does not suggest any insight on how tempo and mood interact to affect listeners' mood. However, there may be a certain threshold for musical tempo in which one can enjoy listening different rhythm patterns. As tempo reaches to higher levels (e.g.,, 140 BPM), the threshold is exceeded, making it irritating to hear more rhythmic expressions. This interaction effect may be further explained by designing more thorough tempo and rhythm manipulations.

Finally, data suggest no main or interaction effects of tempo and rhythm on music intentions, and purchase intentions. This finding implies that changes related to tempo and rhythm have an influence on neither consumers' desire to re-listen to the music nor their purchase intentions. As explained previously, this result may be normal since the present study did not manipulate other musical variables accordingly.

Manipulating various musical elements along with tempo and rhythm may produce different effects on behavioral intentions.

Theoretical Implications

The present study explored the effects of musical tempo and rhythm on consumers' temporal perceptions. This study provides important theoretical and methodological contributions to the literature in many respects. In methodological terms, the present study is unique in using rhythm as an independent variable. In this sense, it also constitutes an example for future time perception investigations as to the manipulation of musical rhythm. Second, present study also employed digital technology for tempo and rhythm manipulations to minimize the potential confounding effects of other musical elements. This is a rather nascent technology in music-related time perception research. It provides more strict control over the experimental variables, thereby improving the internal validity of the research. Prior to the present research, only three studies have used digital manipulation to investigate tempo effects on time perception. In this respect, the present study joins to a newly emerging literature within the broader time perception research stream.

In terms of theoretical contributions, the present study is unique in documenting a significant tempo effect on the perception of short durations. Two previous investigations that used short-duration treatments (Oakes, 1999; Oakes & North, 2006) did not report a significant tempo effect on duration judgments. The present study

confirmed that musical tempo influences temporal perception not only under long time intervals (Oakes, 2003), but also under shorter time intervals.

The present research also provides interesting findings about the effects of musical rhythm on time perception. For the first time in this literature, the present study established that rhythm influences the perception of time. It is found that the effects of rhythm become more pronounced under higher tempo levels. By introducing rhythm into music-related time perception research, the present study widened the boundaries of the literature.

Finally, the present study provides empirical evidence for the cognitive models of retrospective time. These models suggest a positive relationship between the amount of information processing and the magnitude of duration estimates. In line with this premise, the present study has showed that individuals report longer duration estimates for faster and more rhythmic music because this type of music contains more musical data to be processed. The high amount of musical data contained in faster and more rhythmic music constitutes a relatively heavier information processing load for the listener. Consequently, as individuals process more musical information from this type of music, they report longer duration estimates.

Practical Implications

Music-related consumer research still has a lot to explore on the relationship between musical tempo, rhythm, and temporal perception. Yet, findings of the present study offer some preliminary practical implications.

First, the findings confirm that consumers' subjective time experiences can be altered with musical elements, specifically with tempo and rhythm. The ability to manipulate consumers' time perceptions with music may provide valuable advantages to marketers. For instance, shortening the perceived waiting duration in a commercial environment (e.g., retailers, banks, restaurants, airports) may have a positive effect on service evaluation and customer satisfaction. Customers who perceive the waiting duration of a service encounter as shorter would be more likely to develop positive evaluations toward the service provider. Alternatively, marketers can benefit also by expanding the perceived time interval of stimulus events. For instance, amplifying the perceived duration of a shopping experience may lead customers to shop more quickly, which in turn may result in a faster in-store traffic. Previous research provides that consumers view time as an important factor of the total cost of transactions (Kellaris & Kent, 1992). Findings of the present study suggest a solution as to how this cost may be reduced by using musical tempo and rhythm.

The present study also suggests that arousal increases as a function of fast and more rhythmic music. Using such music may have different consequences in different commercial contexts. For instance, a high arousal music may serve as a distraction that can reduce cognitive resources. Hence, a high arousal music would not serve to the purpose of an ad conveying its message through the central processing route. In a very different scenario, a high arousal music would be the perfect choice for sports or entertainment events targeted at young consumers.

To summarize, the present study establishes that both consumers and marketing practitioners may benefit greatly by understanding how music influences human

behavior. It is hoped that these findings will serve the society as a whole in building a better and more efficient marketplace.

Limitations and Future Research

As with most experimental studies, the use of a convenience sample of undergraduate students reduced the generalizability of research findings. More research is needed with different demographics.

Another research limitation involves tempo and rhythm manipulations. The present study used two levels (slow: 70 BPM; fast: 140 BPM) for tempo manipulation. Future research can investigate tempo effects on duration estimates under moderate tempo levels (around 100 BPM). Furthermore, the present study used a simple 4/4 time for rhythm manipulation. Although this rhythm pattern was used deliberately to maintain ease of listening for the subjects, future research can explore rhythm effects under more complex rhythm patterns (e.g., even – uneven, common – novel). More complex rhythm patterns may have different impacts on time perception.

Future research can also add other musical variables to the research design. Musical mode seems to be a perfect candidate for this purpose. Previous research suggests that music in major mode expands duration estimates (Kellaris & Kent, 1992). Exploring tempo, rhythm, and mode interactions, therefore, may provide valuable contributions to the literature.

PART II

DRAMATIC CONTRAST: WHAT HAPPENS TO CONSUMERS WHEN THEY GET LOST BETWEEN CONFLICTING EMOTIONS?

CHAPTER I

INTRODUCTION

"As a pure organ of the feeling, music speaks out the very thing, which word speech in itself cannot speak out…that which, looked at from the standpoint of our human intellect, is the unspeakable." (Richard Wagner)

A rich literature body in music-related consumer research concerns consumer responses towards stimulus (in)congruity. Consumer research has typically investigated the effects of stimulus congruity in a picture-word consistency context. A general finding from these studies (Lutz & Lutz, 1977; Childers & Houston, 1984; Heckler & Childres, 1992, Unnava & Burnkarnt, 1991) is that recall of advertising, brand name, and product attributes are enhanced when both pictures and words communicate the same information.

Music-related consumer research began to focus attention on stimulus congruity with the seminal work of MacInnis & Park (1991). The authors used the phrase *fit* to operationalize the construct. MacInnis & Park (1991) manipulated fit by (mis)matching the relevance of song lyrics to the advertising copy. The authors found a significant effect of fit on message processing, positive emotions, and attitude toward the ad, especially for low involvement individuals. It should be noted that in the MacInnis & Park (1991) study, "lyrics", in stead of "music", was used to manipulate fit. More specifically, although this study involved music, it mainly explored the effects of congruity between two verbal cues (song lyrics and ad message).

In contrast to MacInnis & Park (1991), Kellaris et al., (1993) operationalized stimulus congruity in terms of music's relevance with the ad message. In this respect, this study is the first to investigate the role of music in the context of stimulus congruity. Kellaris et al., (1993) manipulated music's attention-gaining quality, and its congruity with the ad arguments. The authors suggested that high congruity between music and message moderated the effect of music's attention-gaining property on ad recall and recognition. More specifically, attention-gaining music positively affected subjects' information processing when music was congruent with the ad message. Similarly, North et al., (2004) also showed that a high music-message congruity led subjects to generate better recall for ad content. Oakes & North (2006) also explored the effect of congruity on ad content recall. The authors manipulated congruity in terms of fit between musical timbre and ad message. Findings suggested that a high fit between timbre and message enhanced both at content recall, and positive affective responses toward the ad.

Music-message congruity was also studied in terms of its effects on time perception. Kellaris & Mantel (1996) manipulated music-message congruity along with music arousal, and found that arousal moderated the effect of congruity on ad duration estimates. The authors reported that when music arousal was low (e.g., calm, relaxing music), music-message congruity had a significant positive effect on duration estimates.

Music-related consumer research has only recently focused its attention on the topic of stimulus congruity. Therefore, the literature is still far from providing a comprehensive picture of how music-message (in)congruity affects consumer responses. Furthermore, the literature has relatively nothing to suggest as to how and what type of

consumer reactions are formed when music and message convey contrasting (in stead of incongruent) emotions and meanings.

Emotion theory suggests that simultaneous experience of oppositely charged emotions is a frequent phenomenon in the lives of individuals (Bee, 2005). In fact, oppositely valenced stimuli (e.g., happy music versus sad image) are often used in cinema to bolster the dramatic impact of a scene (Boltz, 2004). Furthermore, this technique is used also by advertisers to increase the persuasiveness of ad appeals (Williams & Aaker, 2002). Compared to music-message incongruity, music-message contrast may activate different cognitive and affective processing mechanisms. As a result, consumers may develop quite different reactions toward music-message contrast (versus music-message incongruity). Therefore, the music-related stimulus congruity literature may have a lot to gain from studies that explore consumer responses toward stimuli containing contrasting emotions.

The present study was designed to explore how contrasting music and message emotions affect consumers' memory, attitudes, and time perceptions. The objective was to establish a meaningful bridge between stimulus congruity and emotional ambivalence literatures.

CHAPTER II

LITERATURE REVIEW

Emotional Ambivalence

Since the seminal work of Holbrook & Hirschman (1982), and Hirschman & Holbrook (1982), emotion has occupied a pivotal position in the field of consumer research. Although research effort has traditionally focused on investigating the effects of pure emotions, a nascent body of research is emerging on the experience of conflicting emotions (Williams & Aaker, 2002). This new research stream posits that oppositely charged emotions can be experienced jointly (Andrade & Cohen, 2007, Larsen et al., 2004, Priester & Petty, 1996; Thompson, et al., 1995). The term jointly should be used with caution (Janssens & De Peslmacker, 2006). Some evidence suggest that conflicting emotions can be experienced simultaneously (Thompson, et al., 1995; Priester & Petty 1996; Cacioppo, et al., 1997; Williams & Aaker, 2002; Larsen, et al. 2001; Aaker, et al., 2005). According to this viewpoint, emotional valence is represented by two independent dimensions, and, hence, oppositely charged emotions can co-occur. An alternative viewpoint postulates that opposite emotions lie on a single bipolar dimension (Brehm & Miron, 2006; Russell, 1980; Russell & Carroll, 1999), which makes them impossible to be experienced simultaneously. Rather, conflicting emotions occur in close sequential proximity. Therefore, the term "jointly" may be taken either as "simultaneously" or as "in close sequential proximity", depending on the researcher's viewpoint (Janssens & De Peslmacker, 2006).

The literature has witnessed various terms and inconsistent descriptions as to the experience of emotional ambivalence (Bee, 2005). Some of these descriptions view emotional ambivalence as a combination of emotional valences. For instance, Ruth, et al. (2004) use the term multiple emotions to describe "any combination of emotions – positive, negative, or a mixed of both". Similarly, Otnes et al. (1997) use the notion consumer ambivalence to refer to "the simultaneous or sequential experience of multiple emotional states". Some other descriptions view emotional ambivalence as the simultaneous experience of positive and negative emotions (Larsen, et al., 2001, Williams & Aaker, 2002, Aaker, et al., 2005). Williams & Aaker (2002), for instance, use the phrase duality to refer to the simultaneous experience of conflicting emotions. In the present study, the joint experience of positive and negative emotions is referred to as emotional ambivalence. Emotional ambivalence is different from attitudinal ambivalence in that it involves conflicting emotions rather than conflicting evaluations toward a stimulus object (Bee, 2005).

Individuals experience emotional ambivalence at many junctures, especially at important life moments. For instance, a father at his daughter's wedding may feel both happy (because his daughter is beginning a new life), and sad (because she is about to fly away from home). Similar experiences of emotional ambivalence may be present while moving to a new neighborhood, starting to a new job, graduating from school, etc. However, emotional ambivalence is not restricted to important life moments only. Research suggests that individuals may experience emotional ambivalence on quite ordinary occasions, such as watching a film (Larsen, et al., 2001), seeing a TV commercial (Edell & Burke, 1987; Madrigal & Bee, 2005), or viewing a print ad

(Williams & Aaker, 2002, Janssens, et al., 2007). For instance, a film scene may evoke conflicting emotions by mixing the song What a Wonderful World with images of poor villagers being bombarded by fighter planes (actual scene from the movie Good Morning Vietnam, 1987). In another example, an ad for a life insurance company may elicit emotional ambivalence by conveying jointly (1) grief over a family mourning for their recently deceased father, and (2) comfort over the idea that the deceased father had secured his family's future by purchasing life insurance (actual ad for New York Life Company, circa 2001).

Factors that Influence the Processing of Emotional Ambivalence

A body of research in the emotional ambivalence literature has centered on factors that determine when and how people are likely to experience emotional ambivalence. Findings suggest that such factors as age (Labouvie – Vief, et al., 1998; Williams & Aaker, 2002), gender (Bagozzi et al., 1999; Fong & Tiedens, 2002), culture (Bagozzi, et al, 1999, Williams & Aaker, 2002), and discomfort with ambiguity (Janssens & De Pelsmacker, 2006; Janssens, et al., 2007) can play a moderating role in the experience of emotional ambivalence.

Age and gender seem to be important factors that influence the experience of emotional ambivalence. For instance, research suggests that older adults, compared to younger adults, better deal with complex and conflicting emotions (Labouvie-Vief, et al., 1998, Carstensen, et al, 1999). Moreover, age is also found to have a positive influence on the recall of mixed emotional stimuli (Aaker, et al., 2005). Gender is another variable

that shapes the experience of conflicting emotions. A general finding is that women experience more emotional ambivalence than men (Fong & Tidens, 2002). Furthermore, gender seems to interact with cultural background, where emotional ambivalence becomes stronger for women, and weaker for men in independent cultures (Bagozzi, et al., 1998).

In addition to age and gender, culture is also found to have a strong impact on the experience of emotional ambivalence. Williams & Aaker (2002) investigated the effect of emotional ambivalence on consumers' ad attitudes, and reported that the extent to which respondents react to conflicting emotional messages depends on cultural background and age. The authors found that elderly people, and individuals from Eastern cultures (versus Western cultures) possess a relatively higher propensity to cope with the concept of duality. Because such individuals can more easily process duality, they develop less negative responses toward messages conveying conflicting emotions. On the other hand, younger people, and individuals from Western cultures are less successful in processing duality, and, therefore, respond more negatively to such messages. Similarly, Bagozzi et al. (1998) suggested that interdependent cultures, rather than independent cultures, have a higher ability to process conflicting emotions. Kramer, et al. (2007) documented that bicultural individuals experiencing conflict about their cultural duality react more favorably to mixed emotional appeals with (versus without) coping frames to reduce felt discomfort associated with emotional duality.

Aside from cultural factors, research also investigated the influence of personality traits in experiencing emotional ambivalence. For instance, Janssens & De Pelsmacker (2006), and Janssens, et al. (2007) investigated the moderating role of

discomfort with ambiguity (DWA) on the processing of mixed emotional ad appeals. Discomfort with ambiguity refers to a personality trait, which determines how individuals experience ambiguous thoughts and feelings. It is a subconstruct of the need for closure scale (NFCL), which reflects an individual's need for clear, structured knowledge (Janssens & De Pelsmacker, 2006). Individuals with a high need for closure seek to arrive at quick conclusions about a stimulus event, and are motivated to quickly end cognitive information processing related to the event (Webster & Kruglanski, 1994). Similarly, individuals with a high discomfort with ambiguity possess a lower level of propensity to accept and process duality. Hence, they experience a higher level of displeasure when confronted with ambivalent emotions and meanings. Conversely, individuals scoring low on discomfort with ambiguity tend to react more positively to stimuli containing ambiguous emotions and meanings.

Janssens & De Pelsmacker (2006) operationalized emotional ambivalence by contrasting the emotions conveyed by the medium context and those conveyed by the advertisement. The authors found partial support for the hypothesized moderation of discomfort with ambiguity, such that individuals with a high level of DWA developed more positive responses when the emotional tone of the ad supported that of the medium within which the ad was embedded. A similar finding was reported by Janssens, et al. (2007). In this study, the authors reported that DWA plays a moderating role in the processing of emotional ambivalence not only in a medium – ad context, but also in a within - ad context.

From Emotional Ambivalence to Dramatic Contrast

Consumer research on emotional ambivalence is still in its infancy, and there are very few studies that investigate the subject in the context of advertising (Janssens & Pelsmacker, 2006). In a majority of these investigations, emotional ambivalence is manipulated through visual cues such as, pictures and ad copy (e.g., Williams & Aaker, 2002; Janssens, et al., 2007). These studies generally involve exposing subjects to stimulus ads where pictures and texts convey oppositely valenced emotions. Although they provide valuable knowledge as to the formation of consumer responses toward mixed emotional ads, findings generated by these investigations remain limited since they only relate to the visual aspect of advertising. In order to shed a brighter light on the phenomenon, emotional ambivalence research should also focus its attention on the effects of auditory ad cues, such as jingles, and background music.

As Leo Tolstoy once remarked, "music is the shorthand of emotion". In fact, the effectiveness of music in delivering emotions is so well known by advertising practitioners that it is almost impossible to find a radio or TV ad without a jingle or background music. Although music is a powerful conveyor of emotions, the fact that it has not been used in emotional ambivalence research is quite peculiar.

The present study is a unique example in the literature in that emotional ambivalence is manipulated via background ad music. It constitutes a first scholarly attempt to understand how consumers react to emotional ambivalence conveyed through auditory cues. Stimulus ads developed for the present research contain background music that either supports or contrasts the emotional tone of the ad copy. The present

study uses the phrase dramatic contrast to describe the emotional ambivalence that results from conflicting music and copy emotions. Dramatic contrast differs from emotional ambivalence in that it refers to the specific state of experiencing conflicting emotions via conflicting auditory and verbal stimuli. The present study also uses the term dramatic congruity to describe the unipolar emotions that results from congruent music and message emotions. Additional discussion on these newly proposed constructs are provided in the Research Design section.

CHAPTER III

HYPOTHESES

Research investigating the effects of stimulus congruity on memory generally report that subjects' information processing and recall of a stimulus event are lower when the elements related to the stimulus convey different information (Lutz & Lutz, 1977; Childers & Houston, 1984; Srull et al., 1985; Heckler & Childers, 1992, Unnava & Burnkarnt, 1991). This may result from a number of factors ranging from the difficulty of encoding incongruent information (Heckler & Childers, 1992; Meyers-Levy & Tybout, 1989) to the weaker linkages between unrelated nodes in the associative network (Schmitt, et al., 1993). Emotional ambivalence research also suggests a negative relationship between conflicting emotions and information processing (Aaker et al., 2005).

Music-related research on stimulus congruity produced only two studies that investigated the effect of stimulus congruity on temporal perception. Kellaris et al (1993) suggested that congruent background music that was also highly arousing generated a positive effect on ad memory. Oakes & North (2006) reported that congruity between musical timbre and ad message enhanced ad content recall.

Translating these findings into the present research, a negative relationship is suggested between dramatic contrast and ad processing. Since individuals experience difficulty in processing conflicting emotions, an ad that contains dramatic contrast (versus dramatic congruity) should generate a lower ad memory. Therefore, a direct effect of dramatic contrast is hypothesized.

Hypothesis 1: Dramatic contrast, (versus dramatic congruity), will generate a significant negative effect on subjects' a) recognition, and b) recall of central ad arguments.

Research also suggests that the experience of emotional ambivalence can be moderated by factors, such as age, culture, and discomfort with ambiguity. As previously explained, discomfort with ambiguity (DWA) refers to a personality trait, which determines how individuals experience ambiguous emotions and meanings. The more of it implies a reduced capacity for the processing of ad appeals containing conflicting emotions. Therefore, the effect of dramatic contrast should be stronger for those individuals with high DWA. More specifically, an ad that conveys its message through dramatic contrast should elicit less ad memory in consumers with high (versus low) DWA.

Hypothesis 2: Subjects high (versus low) on DWA will generate significantly worse message a) recognition, and b) recall in the presence of dramatic contrast.

Retrospective models of time perception (e.g., Ornstein, 1969, Block, 1990, Zakay & Block, 1996), postulate a positive relationship between duration judgments and the amount of information processing. More specifically, as individuals encode and retrieve more information from a stimulus, they perceive the stimulus duration as being longer. This process should also govern the relationship between dramatic contrast and memory. In other words, because individuals cannot easily process emotional ambivalence, they should process less information from an ad containing dramatic contrast. When these individuals are asked to estimate the duration of the ad, they should report shorter estimates because their judgments are based on the amount of information

stored in their memory. This relationship should be even stronger for individuals with high discomfort with ambiguity.

Hypothesis 3: Subjects exposed to dramatic contrast (versus dramatic congruity) will generate significantly shorter duration estimates.

Hypothesis 4: Subjects scoring high (versus low) on DWA will report significantly shorter duration estimates in the presence of dramatic contrast.

Music-related research on stimulus congruity suggests a negative relationship between music-message incongruity and affective responses toward the ad (Oakes & North, 2006). Research on emotional ambivalence also provides that ads containing conflicting emotions generate less positive responses among consumers who have a lower propensity to process duality (Williams & Aaker, 2002) and who feels discomfort from ambiguity (Janssens & De Pelsmacker, 2006). In line with previous research, it is hypothesized that an ad that contains dramatic contrast (versus dramatic congruity) should generate less positive ad and brand attitudes. Furthermore, this effect should be stronger for those with high DWA.

Hypothesis 5: Subjects exposed to dramatic contrast (versus dramatic congruity), will generate significantly less positive a) brand attitudes, b) ad attitudes, and c) behavioral intention.

Hypothesis 6: Subjects scoring high (versus low) on DWA will report significantly less a) brand attitudes, b) ad attitudes, and c) behavioral intention.

CHAPTER IV

RESEARCH DESIGN AND METHODOLOGY

Participants and Design

Two hundred and sixty undergraduate students from a major Istanbul university were recruited to participate in the study. The ages of participants ranged from 18 to 26 (53% female). Subjects were naive to the objectives of the study and they were offered extra course credit as an incentive to participate in the study.

The present study was designed to test the hypotheses that dramatic contrast in an ad (i.e., the emotional ambivalence that results from conflicting music and message emotions) leads consumers to report (1) lower recall and recognition for central ad arguments, (2) shorter ad duration estimates, and (3) less favorable ad, and brand attitudes. Dramatic tone, and discomfort with ambiguity (DWA) were manipulated in a 2 (Dramatic Tone: contrast, congruity) by 2 (DWA: high, low) between-subjects design. Following previous research, DWA was measured on a five item, seven-point Likert scale (Vermeir 2003, Webster & Kruglanski, 1994). The score of the DWA variable was transformed into a categorical variable by means of median split to meet the statistical requirements of ANOVA (Janssens & De Pelsmacker, 2006).

TV ads with original music and copy were designed to operationalize the independent variables. The procedure involved randomly assigning subjects to treatments, exposing them to the ads in small groups, and asking them to complete a self-administered questionnaire. Subjects watched the ads in small groups through a

projecting device in a classroom. The whole experimental procedure took about 20 minutes to complete.

Stimuli Development and Pilot Tests

Four experimental TV ads were designed for a fictitious NGO titled "Playground for Poor Children". Original music scores for the ads were composed by a team of professional musicians who were experienced in the field. In the first study of this dissertation, it was thoroughly explained musical sound consists of multiple musical elements (e.g., mode, tempo, texture, etc.). In any music-related research, these musical elements should be carefully used to manipulate the independent variables. Otherwise, possible interaction effects may have a confounding effect on the observed relationships. Accordingly, the music scores used in the present study were composed with outmost attention to the multidimensionality of musical sound. For instance, in the happy ad music condition, a music score of major mode, and moderate tempo were chosen to create the desired positive emotional valence. Moreover, pop music instruments were used to support the emotional impact of the music. Alternatively, the sad ad music was written in minor mode, and slow tempo. To emphasize the emotive character of music, the score was played on a lead piano accompanied by sorrowful background strings.

Ad copy was voiced by a professional actor to bolster the dramatic quality of the ads. The negatively framed ad copy read "Each year, thousands of poor children are growing up without toys. Deprived of the benefits of playing with toys, these children are, in fact, growing up in an unhealthy environment where there is little room for fun,

imagining, and learning. Today's unhappy children will join our society tomorrow as unhappy adults. Don't let them grow up unnoticed; let poor children also play with toys. Please contact us through our website if you wish to donate old toys to Playground for Poor Children."

The positively framed ad copy read "Playing with toys has many wonderful benefits for children. Children who play with toys grow up in a healthy environment where there is ample room for fun, imagining, and learning. Today's happy children are tomorrow's happy adults. Help poor children; let them also play with toys. Please contact us through our website if you wish to donate old toys to Playground for Poor Children."

To create the ads, music and copy were mixed as a single audio track. This audio track was then mixed with a video track, which contained a color photograph. An emotionally neutral (neither happy nor sad) photograph had to be chosen to minimize possible confounding effects. To find such an image, a group of sixty subjects was asked to rate three candidate photographs in terms of emotions they evoked. Responses were recorded on a single item, seven-point semantic differential scale (1 = very sad, 7 = very happy). The results revealed that, among the three candidates, a color photograph of a little child holding a ball was emotionally more neutral ($\mu = 3.82$) compared to other two images ($\mu = 2.90$; $\mu = 3.44$).

The whole process resulted in four TV ads that differed in terms of congruency between musical valence and message framing. The mixing of audio and video tracks was done in a film studio by a professional film editor. The ads were identical in terms of duration (forty-five seconds), and information they contained.

Dramatic contrast was operationalized by mismatching the emotional character of music (either happy or sad) with the psychological framing of the ad message (either positive or negative framing). Dramatic congruity was operationalized by matching the music and message emotions. The term dramatic tone was used to differentiate between the two types of dramatic qualities. More specifically, depending on the dramatic tone of the ad, the background music either contrasted (dramatic contrast) or supported (dramatic congruity) the central ad argument.

Discomfort with ambiguity (DWA) was measured with a five item, seven-point semantic differential scale (α= .852) adapted from Webster & Kruglanski (1994). Items of the scale included (1) I feel uncomfortable when someone's meaning or intentions are unclear to me; (2) I do not like it if I do not understand why someone makes a particular statement; (3) I always want to know why certain people make certain decisions; (4) I do not like it when people make statements that can be interpreted in different ways; (5) I always like to know immediately what people mean when they say something.

Pilot Test

A pilot study with a 2 x 2 factorial design (emotional character of music: happy, sad), (type of message: positively framed, negatively framed) was conducted to test whether experimental ads successfully evoked dramatic contrast and congruity. Sixty undergraduate students (60 % female, M_{age} = 21.24) participated in the pilot study. After viewing one of the four ad conditions, participants indicated the degree to which they experienced a set of emotions in response to both ad music and ad message. Responses

were recorded on a seven-point scale ranging from not at all (1) to very strongly (7). Emotional items to measure felt emotional responses were identified by following previous research (e.g., Edell & Burke, 1987; Holbrook & Batra, 1987; Izard, 1977; Richins, 1997). Five items were chosen to create a happiness index (happy, delighted, joyful, pleased, and cheerful) and six items were chosen to create a sadness index (sad, downhearted, distressed, sorrowful, dejected, and regretful). Moreover, five filler emotions were also included to increase sensitivity of the measurement. .

First, analyses checked whether music and message successfully evoked the intended emotions. Subjects rated how much the ad music made them feel happy (α= .914) and sad (α= .846). Participants listening to the happy (positively valenced) music reported significantly higher positive feelings (μ= 4.12) compared to those listening to the sad (negatively valenced) music (μ= 2.22) ($F_{1,58}$= 50.417; p< .001). Furthermore, subjects under the sad music condition generated significantly higher negative feelings (μ= 3.90) compared to those under the sad music condition (μ= 2.63) ($F_{1,58}$= 12.356; p< .001). Subjects also indicated how much the central ad message made them feel happy (α= .919) and sad (α= .857). Participants under the positively framed message condition reported significantly higher (μ= 4.16) positive feelings compared to those under the negatively framed message condition (μ= 2.16) ($F_{1,58}$=16.078, p<.001). Subjects who listened to the negatively framed message generated significantly higher negative feelings (μ= 3.92) compared to those who listened to the positively framed message (μ= 2.96) ($F_{1,58}$= 7.415, p= .009). These results confirmed that the music and message manipulations were successfully done.

The second part of the analysis checked whether the experimental ads successfully created dramatic contrast and congruity. In the dramatic contrast condition, findings revealed no statistically significant mean difference in the magnitude of emotions evoked by the music and the message. The dramatic contrast ad that contained happy music and negatively framed message made subjects experience a mixture of both positive (μ= 3.9) and negative emotions (μ= 3.7) of similar magnitude (t= .499; p= .625). The other dramatic contrast ad that contained sad music and positively framed message generated a similar impact where subjects experienced no significant difference in the magnitude of felt happiness (μ= 4.11) and happiness (μ= 3.94) (t= .266; p= .794). Findings revealed that these two ad conditions were successful in creating dramatic contrast. Analyses produced similar results for the two dramatic congruity conditions. In the positive dramatic congruity condition (i.e., positive music and message emotions), a significant mean difference was observed between felt happiness (μ= 4.33) and sadness (μ= 2.58) (t= 3.76; p= .002). In the negative dramatic congruity condition (i.e., negative music and message emotions), a significant mean difference was observed between felt sadness (μ= 3.76) and happiness (2.38) (t= -2.498; p= .026). All together, findings suggested that the two dramatic congruity ads successfully created the intended emotions.

Dependent Variables

Attitude Measures

Subjects were asked to report their attitudes toward the ad (Aad) on a four-item, seven-point semantic differential scale (α= .904) (adapted from MacInnis & Park, 1991) that asked whether the ad they see was very bad (1) or very good (7); not at all likable (1) or likable (7); unfavorable (1) or favorable (7); unappealing (1) or appealing (7).

Subjects' attitudes toward the brand (organization) (Ab) were measured by a 5 item, seven-point semantic differential scale (α= .909) adapted from MacKenzie, Lutz and Blech, (1986). The items asked whether the advertised organization was not likeable (1) or likeable (7); not at all interesting (1) or very interesting (7); very bad (1) or very good (7); unfavorable (1) or favorable (7); not appealing (1) or appealing (7).

The last attitude measure tapped subjects' behavioral intention toward the organization. Subjects rated their attitudes on a 4 item, seven-point Likert scale (α= .861) adapted from Janssens, De Pelsmacker, and Weverbergh (2007). Scale items were as follows: (1) after watching this ad, I consider making a donation to this organization; (2) I would rather donate money to this organization than to another similar organization; (3) after watching this ad, I am going to inform myself better about the operations and targets of this organization; (4) by watching this ad, I am prompted to make an effort to help this organization.

Recall and Recognition Measures

Following prior research, message recall was measured by asking the subjects to list as many messages as they could remember from the ad (Kellaris, et al., 1993). Responses were then compared against the ad copy with exact or very similar answers rated as accurate. Coding of message recall was initially done by the author. After the initial coding, a second researcher re-coded the answers, which revealed a significantly high association between the two codings (Cohen's Kappa= .827).

To measure message recognition, the present study used checklists that asked subjects to identify the advertised message arguments (Singh, Rotschild, & Churchill, 1988). In order to increase the sensitivity of the measure, the checklist used filler items including "I can't remember", and "none of the above" (Kellaris, et al., 1993).

Perceived Duration

Subjects' duration estimates were measured by asking them to select a number from a table that included numbers ranging from 1 to 180 (Oakes, 1999). The instructions read: "Please indicate the duration (in terms of seconds) of the music you have just heard. Try to be as precise as possible even if you are not sure".

Other Measures

The questionnaire also included demographic measures on subjects' age and gender.

CHAPTER V

DATA ANALYSES AND FINDINGS

Manipulation Checks

Manipulations were checked to understand whether the experimental ads successfully created dramatic contrast and dramatic congruity. After viewing one of the ads, subjects rated the degree to which they experienced a set of emotions on a seven-point scale ranging from not at all (1) to very strongly (7). The emotional indices that were used for the pilot test were used for the manipulation checks. Subjects rated how much the ad music made them feel happy (α= .952) and sad (α= .923). Subjects also indicated how much the central ad message made them feel happy (α= .943) and sad (α= .889).

First, analyses checked whether the stimulus ads successfully created dramatic contrast. Findings revealed that the dramatic contrast ad that contained happy music and negatively framed message induced no significant difference between felt happiness (μ= 4.62), and sadness (μ= 4.52) (t= -.237; p< .813). Similarly, the other dramatic contrast ad (sad music and positively framed message) evoked no significant difference between positive (μ= 4,67) and negative (μ= 5,17) emotions (t= 1.289; p< .202). These results confirmed that the two dramatic contrast ads successfully created the intended emotional ambivalence.

Analyses also checked whether congruent emotions were successfully evoked by the two dramatic congruity ads. Under the happy dramatic congruity ad condition, a significant mean difference was observed between felt happiness (μ= 4.33) and sadness

(μ= 2.58) (t= .376; p< .002). More specifically, subjects who viewed the happy dramatic congruity ad, significantly experienced more positive feelings than negative feelings. Similarly, under the sad dramatic congruity ad condition, felt sadness (μ= 4.13) was significantly greater than felt happiness (μ= 2.38) (t= 3.5; p< .004). All together, manipulation checks revealed that the experimental ads were successful in creating the intended dramatic tones.

Hypotheses Testing

MANOVA

Since the dependent variables of the study (duration estimates, attitude measures, and memory measures) were conceptually related, intercorrelations among these variables were observed. As expected, all three attitude measures (Ab, Aad, intention to donate) were found to be highly correlated (p< .001). Furthermore, a high correlation was also observed between the two memory measures (message recognition, and message recall) (p< .001). Significant intercorrelations were observed also between different dependent variables. For instance, duration estimates correlated significantly with message recognition (p= .016) and Ab (p= .026).

Table 1. Pearson Correlation Coefficients

	Duration Est.	M.Recognition	M. Recall	Ab	Aad	Donate Int.
Duration Est.	1 260					
M.Recognition	- .150* .016 260	1 260				
M. Recall	- .045 .474 260	.354** .000 260	1 260			
Ab	- .138* .026 260	.201** .000 260	.157* .011 260	1 260		
Aad	.003 .958 260	.079 .202 260	- .096 .122 260	.391** .000 260	1 260	
Donate Int.	- .001 .983 260	- .001 .983 260	.030 .634 260	.403** .000 260	.418** .000 260	1 260

A multivariate variance analysis (MANOVA) was performed on the intercorrelated measures to avoid a Type I error. Analysis revealed that dramatic tone had significant main effects on message recognition ($F_{1, 256}$= 6.839; p= .009), duration estimates ($F_{1, 256}$= 19.006; p< .001), ad attitudes ($F_{1, 256}$= 7.815; p= .006), and brand attitudes ($F_{1, 256}$= 6.864; p= .009) (Wilk's Lambda= .846). Furthermore, a significant interaction effect of dramatic tone and DWA was found on message recognition ($F_{1, 256}$= 4.885; p= .028), and brand attitudes ($F_{1, 256}$= 4.094; p= .044) (Wilk's Lambda= .951). MANOVA revealed no main effect of DWA on any of the dependent variables.

Table 2. MANOVA Results for Dramatic Tone and DWA

Independent Variable	Dependent Variable	Wilk's Lambda	F	df	p<
Dramatic Tone	Recognition	.846	7.626	1, 256	.001
	Recall				
	Duration				
	Ab				
	Aad				
	Donate Int.				
DWA	Recognition	.975	1.077	1, 256	n.s.
	Recall				
	Duration				
	Ab				
	Aad				
	Donate Int.				
Dr. Tone x DWA	Recognition	.951	2.156	1, 256	.05
	Recall				
	Duration				
	Ab				
	Aad				
	Donate Int.				

ANOVA

Based on the positive MANOVA findings for main and interaction effects of dramatic tone and DWA, a series of univariate analysis of variance (ANOVA) were also performed on each dependent variable.

Message Recognition and Recall

ANOVA findings on message recognition revealed a significant main effect of dramatic tone ($F_{1, 256}$= 6.883; p= .009), such that recognition was higher under dramatic congruity (μ= 3.75) than under dramatic contrast (μ= 3.19). Therefore, H1a was supported.

Analysis also revealed a significant interaction effect of Dramatic Tone and DWA ($F_{1, 256}$= 4.885; p= .03). More specifically, when dramatic contrast was present, high DWA subjects generated lower recognition for central ad arguments (μ= 2.99) than low DWA subjects (μ= 3.53). Furthermore, when music and message emotions were congruent, recognition was higher for high DWA subjects (μ= 3.92) as opposed to low DWA subjects (μ= 3.61). Therefore, H2a was also supported. Finally, no significant main effect was found for DWA ($F_{1, 256}$= .367; p= .54).

Table 3. Mean Recognition Scores for Dramatic Tone and DWA

Dependent Variable	Dramatic Tone			
	Dramatic Contrast		Dramatic Congruity	
	Low DWA	*High DWA*	*Low DWA*	*High DWA*
Message Recognition	3.53	2.99	3.61	3.92

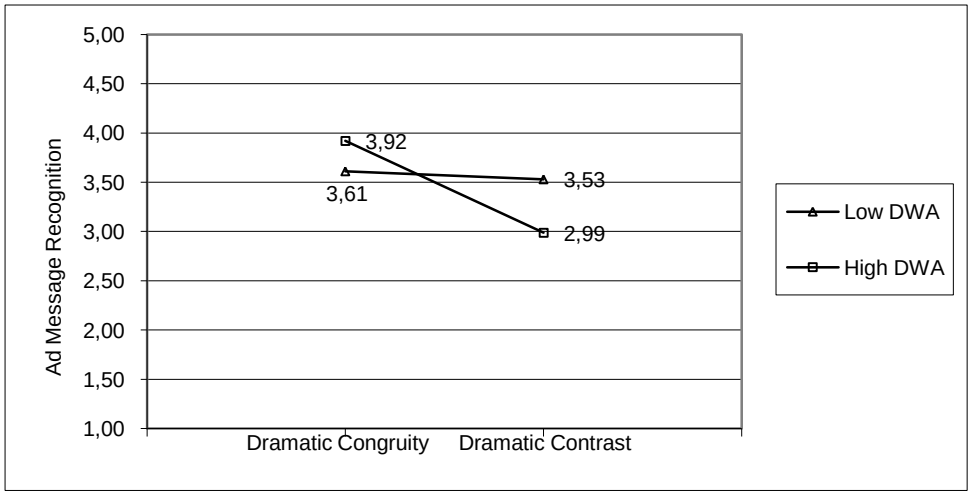

Fig. 1. Interaction of dramatic tone with dwa on recognition

In order to explore which ad condition created the least (versus the most) recognition among high (versus low DWA) subjects, a separate 2 (DWA: high, low) x 4 (Ad conditions: 2 types of congruity, 2 types of contrast) factorial ANOVA was run. Results revealed a significant main effect for ad condition ($F_{1, 252}$= 2.62; p= .05). Also, a marginally significant interaction effect of ad condition and DWA was also found ($F_{1, 252}$= 2.426; p= .06). No main effect of DWA was present ($F_{1, 252}$= .403; p= .52).

Among high DWA subjects, the sad dramatic congruity ad generated the highest message recognition (μ= 4.03), followed by the happy dramatic congruity ad (μ= 3.79). On the other hand, low DWA subjects had identical recognition scores (μ= 3.61) for these two congruity conditions.

Findings also revealed which dramatic contrast ad generated the lowest recognition scores. For high DWA subjects, the "sad music – positive message framing" dramatic contrast ad had a lower recognition score (μ= 2.67) than the "happy music – negative message framing" ad (μ= 3.29). In contrast, low DWA subjects generated a higher recognition score for the "sad music – positive message framing" ad (μ=3.62) than the "happy music – negative message framing" ad (μ= 3.43). Interestingly, message recognition among low DWA subjects was higher under the "sad music – positive message framing" dramatic contrast condition (μ=3.62) than under both dramatic congruity conditions (μ= 3.61).

Table 4. Mean Recognition scores for Ad Condition and DWA

			DEPENDENT VARIABLE	
			Message Recognition	
			Low DWA	High DWA
DRAMATIC TONE	Dramatic Contrast	Happy Music x Sad Message	3.43	3.29
		Sad Music x Happy Message	3.62	2.67
	Dramatic Congruity	Happy Congruity	3.61	3.79
		Sad Congruity	3.61	4.03

In terms of message recall, ANOVA revealed no main effects of dramatic tone ($F_{1, 256}$= 2.746; p= .1). Therefore H1b was rejected. DWA also had no main effects on message recall ($F_{1, 256}$= 2.217; p= .14). No interaction effect of dramatic tone and DWA was found either ($F_{1, 256}$= .349; p= .55). Similarly, planned comparisons provided no significant mean differences, such that for high DWA subjects, dramatic contrast (μ= 1.3) or dramatic congruity (μ= 1.02) generated no difference on message recall ($F_{1,140}$= 2.809; p= .1). A similar result was also found for low DWA subjects ($F_{1,116}$= .516; p= .47). These subjects showed no better recall for dramatic contrast (μ= 1.41) than for dramatic congruity (μ= 1.28). Hence, H2b was rejected.

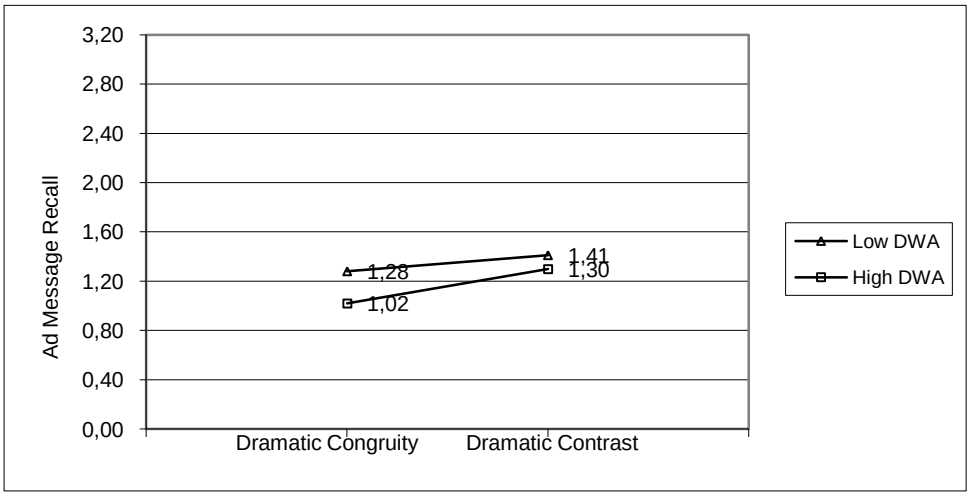

Fig. 2. Interaction of dramatic tone with dwa on recall

Table 5. ANOVA Results for Dr. Tone and DWA on Recall and Recognition

Dependent Variable	Main and Interaction Effects	F	df	p<
Mes. Recognition	Dramatic Tone	6.83	1, 256	.01
	DWA	< 1	1, 256	n.s.
	Dr. Tone x DWA	4.88	1, 256	.05
Message Recall	Dramatic Tone	2.74	1, 256	n.s.
	DWA	2.21	1, 256	n.s.
	Dr. Tone x DWA	< 1	1, 256	n.s.

Retrospective Duration Estimates

ANOVA tested the hypotheses that (a) dramatic contrast (versus congruity) would result in shorter duration estimates, and that (b) high (versus low) DWA subjects would report shorter estimates in the presence of dramatic contrast. Findings revealed a significant main effect of dramatic tone ($F_{1, 256}$= 20.906; p< .001). However, in contrast to the

predictions, duration estimates were significantly longer (almost 11 seconds) when the ad contained dramatic contrast (μ= 59.13) rather than congruity (μ= 48.72). Therefore, H3 was rejected. Furthermore, no interaction effect of dramatic tone and DWA was observed ($F_{1, 256}$= .20; p= .65). Similarly no main effect was observed for DWA ($F_{1, 256}$= 1.126; p= .29).

Table 6. ANOVA Results for Dr. Tone and DWA on Duration Estimates

Dependent Variable	Main and Interaction Effects	F	df	p<
Duration Est.	Dramatic Tone	20.906	1, 256	.001
	DWA	< 1	1, 256	n.s.
	Dr. Tone x DWA	1.126	1, 256	n.s.

Planned comparisons revealed that under dramatic contrast, mean perceived duration was longer for high DWA subjects (μ= 60.37) than for low DWA subjects (μ= 57.08), although the difference was not statistically significant ($F_{1, 128}$= .867; p= .35). Therefore, H4 was rejected. Similarly, under the dramatic congruity condition, mean perceived duration was slightly longer for high DWA subjects (μ= 49,43) than for low DWA subjects (μ= 48,09) ($F_{1, 128}$= .268; p= .60). Furthermore, planned comparisons indicated that duration estimates reported by high DWA subjects were significantly longer ($F_{1, 140}$= 14.857; p< .001) under dramatic contrast (μ= 60.37) rather than dramatic congruity (μ= 49.43). A similar result was obtained also for low DWA subjects ($F_{1, 116}$= 7.224; p= .008), such that duration estimates were significantly longer under dramatic contrast (μ= 57.08) than dramatic congruity (μ= 48.09).

Table 7. Mean Perceived Duration Scores

Dependent Variable	Dramatic Contrast		Dramatic Congruity	
	Low DWA	*High DWA*	*Low DWA*	*High DWA*
Duration Estimates	57.08	60.37	48.09	49.43

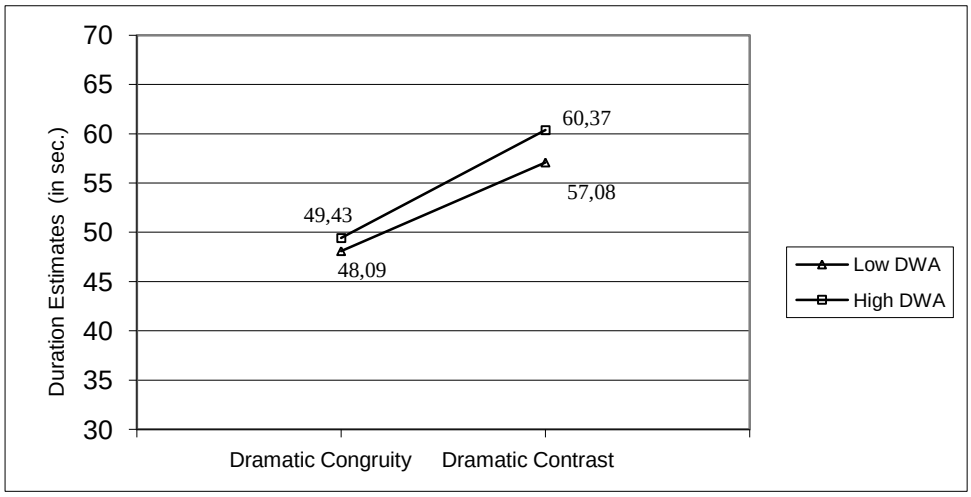

Fig. 3: Interaction of dr.tone with dwa on perceived duration

A separate 2 (DWA: high, low) x 4 (ad conditions: 2 types of congruity, 2 types of contrast) ANOVA was also run to investigate which specific ad condition resulted in more temporal distortion. Findings revealed a significant effect of ad condition on duration estimates ($F_{1, 252}$= 8.245; p< .001). No main effect of DWA ($F_{1, 252}$= 8.245; p< .001), and no interaction effect of ad condition and DWA ($F_{3, 252}$= .450; p< .71) were found.

Among high DWA subjects, the "sad music – positive message framing" dramatic contrast ad generated the longest duration estimates (μ= 63.18), followed by the "happy music – negative message framing" dramatic contrast ad (μ= 57.76). On the other hand, low DWA subjects had the longest duration estimates for the "sad music – positive message framing" dramatic contrast ad (μ= 58.46), followed by the "happy music – negative message framing" dramatic contrast ad (μ= 55.52).

In terms of the shortest duration estimates, high DWA subjects generated the shortest (most accurate) duration estimates for the "happy congruity" ad (μ= 45.93), followed by the "sad congruity" ad (μ= 52.59). On the other hand, low DWA subjects reported the shortest duration estimates for the "happy congruity" ad (μ= 47.67), followed by the "sad congruity" ad (μ= 48.55).

Table 8. Mean Perceived Duration Scores for Ad Condition and DWA

			DEPENDENT VARIABLE	
			Duration Estimates	
			Low DWA	High DWA
DRAMATIC TONE	Dramatic Contrast	Happy Music x Sad Message	55.52	57.76
		Sad Music x Happy Message	58.46	63.18
	Dramatic Congruity	Happy Congruity	47.67	45.93
		Sad Congruity	48.55	52.59

Furthermore, observation of mean levels for each ad condition revealed that the longest duration estimates were reported by subjects who were exposed to the "sad music – positively framed message" dramatic contrast ad (μ= 61.29), followed by those exposed to the "happy music – negatively framed message" dramatic contrast ad (μ=56.97). On the other hand, the shortest estimates were reported in the "positive dramatic congruity" ad condition (μ= 46.89), followed by the "negative dramatic congruity" ad condition (μ= 50.54).

A Tukey (post-hoc) was also conducted to identify which ad condition(s) displayed a significant mean difference in terms of duration estimates. The biggest mean difference (almost 15 seconds) was observed between the "sad music – positive message framing" ad and the "positive congruity" ad ($p < .001$). This was followed by the difference (almost 11 seconds) between "happy music – negatively framed message" ad and the "positive congruity" ad ($p = .005$). Findings are discussed in the following section. According to the findings, subjects' duration estimates did not differ significantly ($p = .62$) between the two "dramatic congruity" ad conditions. There was also no significant difference ($p = .481$) between the two "dramatic contrast" ad conditions. Interestingly, there was also no significant difference between the "happy music – negatively framed message" ad condition and negative congruity condition ($p = .146$).

Attitudes (Ab, Aad, Intention to Donate)

Consumer attitudes were measured by means of three separate attitude scales, namely, brand attitude, ad attitude, and intention to donate. In terms of brand attitudes, ANOVA revealed a significant main effect of dramatic tone ($F_{1, 256}$= 4.864; p= .009), such that mean level of brand attitudes under dramatic congruity (μ= 5.43) was significantly higher than under dramatic contrast (μ= 4.93). Therefore, H5a was supported. ANOVA results also revealed a significant interaction effect for dramatic tone and DWA ($F_{1, 256}$= 4.094; p= .04). More specifically, when music and message conveyed contrasting emotions, high DWA subjects reported significantly lower (μ= 4.75) brand attitudes than low DWA subjects (μ= 5.23). Therefore, H6a was supported. Analyses also revealed that under dramatic congruity, high DWA subjects generated more positive brand attitudes (μ= 5.54) than low DWA subjects (μ= 5.33). Finally, analyses revealed no significant main effect of DWA on brand attitudes ($F_{1, 256}$= .62; p= .43).

Table 9. Mean Brand Attitude Scores

Dependent Variable	Dramatic Contrast		Dramatic Congruity	
	Low DWA	*High DWA*	*Low DWA*	*High DWA*
Attitude toward Brand	5.23	4.75	5.33	5.54

A 2 (DWA: high, low) x 4 (ad conditions: 2 types of congruity, 2 types of contrast) ANOVA explored means differences between specific ad conditions. A significant effect of ad condition on brand attitudes was found ($F_{3, 252}$= 4.205; p= .006). No main DWA effect was present ($F_{3, 252}$= .085; p= .77). There was also no interaction effect either ($F_{3, 252}$= .773; p= .51).

The analysis revealed that among high DWA subjects, the sad congruity ad generated the highest brand attitudes (μ= 4.91), followed by the "happy congruity" ad (μ= 4.63). The same subjects generated the lowest brand attitudes in response to the ‘‘sad music – positive message framing" dramatic contrast ad (μ= 3.97), followed by the "happy music – negative message framing" dramatic contrast ad (μ= 4.08).

Among the low DWA subjects, the highest brand attitude was generated from the "sad congruity" ad (μ= 4.90), followed by the "happy music – negative message framing" dramatic contrast ad (μ= 4.29). These subjects generated the lowest brand attitudes in response to the ‘‘sad music – positive message framing" dramatic contrast ad (μ= 4.08), followed by the "happy congruity" ad (μ= 4.10).

Table 10: Mean Brand Attitude Scores for Ad Condition and DWA

			DEPENDENT VARIABLE	
			Brand Attitudes	
			Low DWA	High DWA
DRAMATIC TONE	Dramatic Contrast	Happy Music x Sad Message	5.52	5.02
		Sad Music x Happy Message	4.96	4.45
	Dramatic Congruity	Happy Congruity	5.18	5.48
		Sad Congruity	5.48	5.59

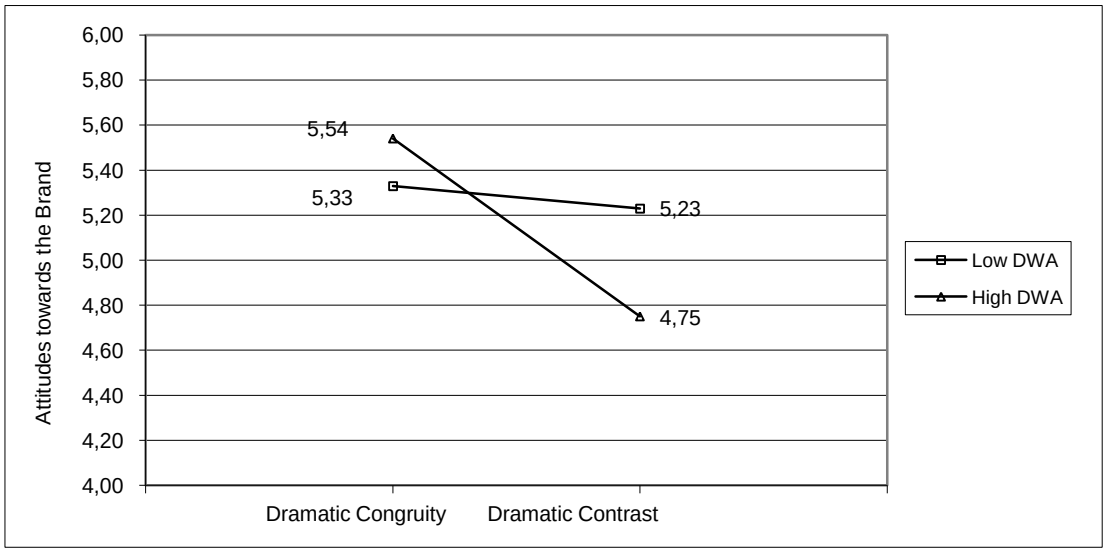

Fig. 4. Interaction of dramatic tone with dwa on brand attitudes

In terms of ad attitudes, dramatic tone had a significant main effect on ad attitudes ($F_{1, 256}$= 7.815; p= .006). Regardless of their level of DWA, subjects developed less favorable ad attitudes towards ads that contained dramatic contrast (μ= 4.08) than congruity (μ= 4.62). Thus, H5b was supported. Analysis revealed no significant interaction effect for dramatic tone and DWA ($F_{1, 256}$= 1.40; p= .238). Therefore, H6b was rejected. Planned comparisons revealed that under high DWA condition, dramatic tone significantly affected ad attitudes ($F_{1, 140}$= 8.820; p= .004). More specifically, high DWA individuals reported higher ad attitudes when the ad contained dramatic congruity (μ= 4.78) rather than dramatic contrast (μ= 4.03). For the low DWA condition, planned comparisons revealed no significant mean difference between dramatic contrast (μ= 4.19) and congruity (μ= 4.49) ($F_{1, 116}$= 1,176; p= .28).

Finally, DWA had no significant main effect on subjects' attitudes toward the ad (F1, 256= 0,147; p= 0,71). Interestingly, ad attitudes for low DWA subjects (μ= 4,36) were almost identical to those for high DWA subjects (μ= 4,35).

Table 11. Planned Comparisons for High and Low DWA

Level of DWA	Dramatic Tone	F	df	p=	Aad
High	Contrast	8.80	1, 140	.004	4.03
	Congruity				4.78
Low	Contrast	.16	1, 116	.28	4.19
	Congruity				4.49

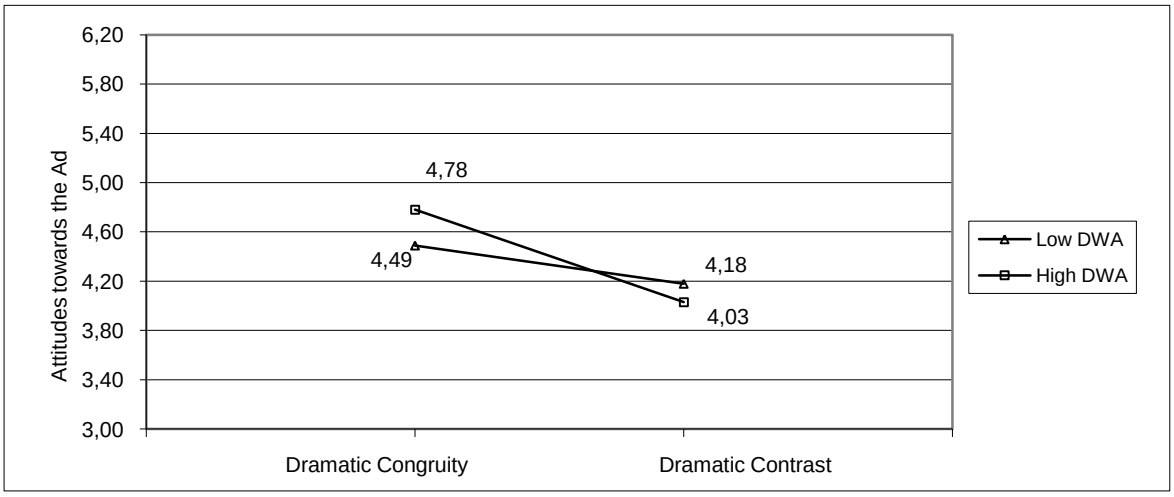

Fig. 5. Interaction of dramatic tone with dwa on ad attitudes

The last measure used to tap subjects' attitudes was a behavioral intention measure. Findings revealed no statistically significant main effects for dramatic tone ($F_{1, 256}$= .474; p= .492) or for DWA ($F_{1, 256}$= 1,873; p= 0,172). Moreover, no interaction effect ($F_{1, 256}$= .014; p= .906) was also observed. Thus, H5c and H6c were rejected.

Table 12. ANOVA Results for Attitude Measures

Dependent Variable	Main and Interaction Effects	F	df	p<
Brand Attitude	Dramatic Tone	4.09	1, 256	.05
	DWA	< 1	1, 256	n.s.
	DrTone x DWA	4.86	1, 256	.05
Ad Attitude	Dramatic Tone	7.81	1, 256	.05
	DWA	< 1	1, 256	n.s.
	DrTone x DWA	1.4	1, 256	n.s.
Donate Intent.	Dramatic Tone	< 1	1, 256	n.s.
	DWA	1.87	1, 256	n.s.
	DrTone x DWA	< 1	1, 256	n.s.

CHAPTER VI

DISCUSSION, IMPLICATIONS AND LIMITATIONS

Discussion of Results

Message Recognition and Recall

Data provided a general support for the hypothesis that dramatic contrast results in reduced ad memory for individuals with high discomfort with ambiguity. As previously discussed, DWA is a subconstruct of the need for closure scale (NFCL), which reflects an individual's desire for clear and definite knowledge (Janssens & De Pelsmacker, 2006). Such individuals experience higher difficulty while processing ambiguous information about stimulus events. In line with previous research, the present study documented that high DWA subjects generate better recognition for ads containing congruent music and message emotions. On the other hand, individuals reported much lower recognition for ads that contained contrasting music and message emotions. It seems that while viewing a dramatic contrast ad, high DWA consumers fail to elaborate on central ad arguments due to the relative difficulty of comprehending two opposite emotions simultaneously. When music and message emotions support the central ad argument, however, these consumers generate no less ad memory than low DWA consumers.

Among the four experimental conditions, the best recognition score was obtained from the "sad dramatic congruity" condition, followed by the "happy dramatic congruity" condition. Previous research suggests that individuals develop higher memory for stimuli that better fit a preexisting cognitive schema (Heckler and Childers, 1992; Meyers-Levy & Tybout, 1989). Following this premise, it may be normal to find a slightly higher recognition score for the sad congruity condition because negative emotions evoked by the sad congruity ad better fit the nature of the advertised theme (poor children without toys).

Findings did not provide support for the hypothesis that high DWA subjects generate lower message recall in the presence of dramatic contrast. This implies that persuasive arguments conveyed through contrasting music and message emotions are poorly recalled regardless of consumers' DWA level. Another interesting finding is that both high and low DWA subjects generated a poor recall no matter if the ad contained dramatic contrast or dramatic congruity. This may be somewhat normal since the present experiment involved a single-exposure to the stimulus ads. Another experiment with a repeat-exposure design may have observed higher recall scores across conditions.

Temporal Perception

Data provided no support for the hypothesis that (1) dramatic contrast in an ad would shrink retrospective duration estimates, and that (2) this distortion would be stronger for high DWA individuals. Exactly contrary to both expectations, findings imply that dramatic contrast has an amplifying effect on consumers' retrospective time perceptions.

Moreover, this effect occurs regardless of consumers' DWA levels. It seems that consumers, in general, perceive the duration of an ad as being longer when emotions evoked by music and message contrast, rather than support, each other.

At first sight, this finding seems in contradiction with the previous retrospective time perception research. Retrospective time perception models postulate a negative relationship between the amount of information processed during an event, and duration estimates about the event (Ornstein, 1969; Boltz, 1991; & Block, 1990). According to these models, individuals typically remember event durations as being shorter when they store and retrieve less information related to an event (Zakay & Block, 1997). Therefore, it is surprising to find longer duration estimates for an ad that generated a lower level of message recognition. Findings on the present study also contradict previous music-related consumer research on time perception. For instance, Kellaris & Mantel (1996) documented a positive relationship between remembered ad duration and music-message congruity, although the result was significant only for the slow music condition.

Although they appear to be inconsistent with previous research, findings of the present study can still be explained within boundaries of the retrospective time perception paradigm. The contextual-change approach to retrospective timing (Block, 1990) postulates that remembered duration of an event expands as a function of the amount of contextual changes stored in memory (Zakay & Block, 1997). These contextual changes are characterized both by external changes related to the stimulus event, and internal changes that stem from changes in meanings, cognitive strategies, or states of mood (Zakay & Block, 1994). According to previous research, external and internal contextual changes create meaningful segments within a given time interval

(Poytner, 1983). As a time interval becomes more segmented, duration estimates are remembered as being longer (Zakay & Block, 1994).

So, it is quite possible that since opposite music and message emotions in a dramatic contrast ad require consumers to simultaneously process separate meanings, the time interval of the ad may be perceived as having two separate meaningful segments. For instance, in a "sad music – positively framed message" ad, individuals have to process at least two meanings: (1) negatively valenced music emotions that communicate sad, sorrowful meanings, and (2) positively valenced ad arguments that convey hopeful, happy meanings. When asked to remember the duration of the ad, these subjects report longer durations because, to them, the stimulus event is represented by multiple meaningful segments in memory. Conversely, in a "positive dramatic congruity" ad, subjects process a single meaning supported by both music and message emotions. As a result, consumers perceive the ad duration as being shorter because they remember the time interval as containing a single meaningful segment.

The present finding is also in harmony with conventional wisdom, which dictates that "a watched pot never boils". This phrase is used to express the naive theory that when an event involves a boring task, time seems to slow down. In fact, previous research also suggests that individuals generate longer duration estimates for stressful stimuli (Vohs & Schmeicel, 2003). This insight may also help explain why individuals estimate longer durations for ads conveying dramatic contrast. The present study provides that consumers, especially those with a high DWA level, develop more negative attitudes toward ads that contain contrasting meanings. For such consumers, processing mixed emotions must be a relatively arduous or maybe even a stressful task.

Consequently, when asked to remember the duration of such a bothersome stimulus, these subjects may have applied a heuristic (Sucala, 2011) based on the naive theory that disliked events seem to last longer than liked events.

Ad and Brand Attitudes, Intention to Donate

Data provided support for the hypothesis that high DWA subjects, compared to low DWA subjects, generate less positive brand attitudes when ad music and ad message communicated contrasting emotions. This constitutes an empirical support for the previous literature, which suggests that emotional ambivalence results in lower attitudes among those who cannot process emotional conflicts (e.g., Williams & Aaker, 2002; Janssens & De Pelsmacker, 2006). It seems that when a brand communicates its message through dramatic contrast, it generates lower brand attitudes among consumers who experience difficulty in dealing with the dual emotions of the ad. Conversely, such consumers develop significantly more positive brand attitudes when the ad communicates dramatic congruity.

Dramatic contrast negatively influences not only brand attitudes, but also ad attitudes. Data suggested that independent of their level of DWA, consumers develop less favorable attitudes toward ads that contain contrasting music and message emotions. However, magnitude of the difference is much stronger among high DWA consumers. In other words, although consumers typically develop less favorable ad attitudes toward dramatic contrast, high DWA consumers react more strongly to it.

Theoretical Implications

The present study makes significant methodological and theoretical contributions to the literatures of emotional ambivalence and stimulus congruity. For the first time in this research stream, the present study used music as an experimental variable to elicit emotional ambivalence (dramatic contrast). It established that consumers can experience emotional ambivalence not only from visual stimuli (e.g., text, picture, etc.), but also from auditory stimuli (background music). The fact that photographs and texts have been widely used in this literature as experimental variables is rather peculiar given the strength of music in communicating emotions and meanings. This may be due to the emotional dominance of music over verbal and visual cues (e.g., text, image, etc.). Because emotions conveyed by music are generally dominant over those conveyed by other cues, it may be difficult for the researcher to create a balance between opposite emotions, which is a crucial task in emotional ambivalence research. Another problem related to using music in emotion research stems from the relative difficulty of minimizing the confounding effects of structural elements that reside within the nature of music. To create a dramatic contrast ad requires more than combining stimuli characterized by opposite emotions. One should also be able to handle the individual musical elements accordingly. It is hoped that the present study will set a good example as to how music can be used in designing mixed emotional research.

The second important contribution of the present study is that it introduced the emotional ambivalence literature with a novel dependent variable, time perception. It is suggested by this study that the experience of opposite emotions influences not only

consumers' attitudes and memory, but also their perceptions regarding the duration of events. In this respect, this study opens a new research avenue for music-related time perception research. It also provides an important evidence in support of the cognitive models of retrospective time perception.

Finally, the present research enriches the literature on emotional ambivalence by proposing the construct dramatic contrast. By doing so, this study defines the experience of a specific type of emotional ambivalence that results from contrasting music - message emotions. It is hoped that more research will follow to explore the role of dramatic contrast on consumers' lives.

Practical Implications

Findings of the present study offer some preliminary implications for advertising practitioners. For instance, it is suggested that before selecting a background music for an ad, advertising practitioners should consider whether the message needs heavy processing. If this is the case, they should select a background music that supports the emotional tone of the message. Because consumers process dramatic congruity more easily, a congruent background music would result in a higher ad memory as well as more favorable attitudes. Furthermore, since congruency between background music and message would also contract the perceived duration of the ad, such an ad would be less likely to create boredom for its viewers.

Findings of the present study are relevant not only to the practice of advertising. As prior research suggests, consumers may experience emotional ambivalence in almost

all commercial contexts. For instance, imagine a crowd of consumers being exposed to a negatively valenced music while waiting in a queue to participate a highly anticipated entertainment event. What kind (if any) of an emotional ambivalence will they go through due to opposite emotions conveyed by the music and the anticipation of the target event? How will their emotional experiences influence their attitudes toward the event? Will the waiting duration be perceived differently due to different emotional experiences? What kind of psychological, personal and cultural factors underlie the differences in developing responses toward ambivalent emotions? It is obvious that each of these questions is directly relevant to the practice of marketing. Therefore, providing healthy answers to these questions may contribute to building a more efficient marketplace for our society.

Limitations and Future Research

An important limitation of the present study is that message recall was measured through single-exposure. The very low level of recall reported in the findings may have stemmed from this very factor. In real life, however, an ordinary consumer is exposed to an ad for more than a single shot. Therefore, a multiple-exposure recall measurement in future research may provide a more realistic picture about the relationship between dramatic contrast and consumer memory. A second limitation stemmed from transforming the score of the DWA variable into a categorical variable by means of median split to meet the statistical requirements of ANOVA. Previous research suggested that this technique may reduce the statistical power to detect interaction (Irwin & McClelland, 2001).

Therefore, future research can use a different data analysis method that would allow DWA to be used as a numerical variable. Such an alternative can be to use a moderated regression analysis (Janssens & De Pelsmecker, 2006).

The present research operationalized dramatic contrast by using a happiness – sadness emotion couple. The use of such a basic emotion couple had practical benefits for the present research. Future research can evoke dramatic contrast through more complex emotion couples (e.g., pride-shame, empathy-anger) (Hesapci, 2007) to provide a more thorough investigation of the topic. Although eliciting complex emotions through music may be a challenging task, one can manage to do so by carefully controlling the structural elements within music.

Another avenue for future research is to explore the effects of dramatic contrast in different contexts. The present research design involved a music-text context. Future research should attempt to evoke dramatic contrast in music-picture or music-only contexts. Developing experimental stimuli in a music-picture context should not be very difficult. However evoking dramatic contrast in a music-only context may be a rather difficult task. Still, it should be possible through a solid understanding of the nature of structural musical elements.

Finally, previous research suggested that music conveys not only emotions, but also meanings (Zhu & Meyers-Levy, 2005). Therefore, future research can explore the construct of dramatic contrast in a wider framework, which includes emotive meanings as well as emotions.

PART III

FINALE

Through two experiments, the present dissertation investigated the influence of music on consumers' memory, attitudes, and time perceptions.

The first experiment revealed that music can bend consumers' time perception through tempo and rhythm. Compared to slow music, fast music creates a temporal illusion where consumers perceive stimulus durations as being longer due to processing a higher amount of musical data. Cognitive models of retrospective time perception suggest that duration of an event is judged based on the amount of information processed from the event. More information processing, therefore, implies longer duration judgments. Accordingly, the first experiment revealed that as consumers process more data from fast (versus slow) music, their time perceptions expand.

Besides confirming that tempo positively affects duration estimates, the first experiment also documented that musical rhythm generates a similar effect on time perception. As the rhythm becomes more complex, consumers report longer duration estimates. However, the effect of rhythm on time perception is moderated by musical tempo. More specifically, rhythm effects become visible only when the musical tempo gets faster.

The first experiment is the first ever attempt to manipulate rhythm in the time perception literature. In doing so, this study established that rhythm is a meaningful independent variable for music-related time perception investigations. Manipulating rhythm, especially when the research design involves musical tempo, can suggest a broader explanation as to how musical elements influence consumers' time perceptions.

The second experiment documented that background music contrasting the emotional character of ad copy can create a state of emotional ambivalence through

which consumers generate various cognitive, affective and behavioral responses. The construct dramatic contrast is proposed to refer to this specific type of emotional ambivalence. A strong predictor of consumer responses toward dramatic contrast is a personality trait named discomfort with ambiguity (DWA). As consumers experience more discomfort from processing ambiguous emotions and meanings, they develop less positive attitudes toward stimuli that contain dramatic contrast. The study also found that because high DWA consumers cannot easily process emotional ambivalence, they produce less memory related to stimuli that contain dramatic contrast. Finally, these consumers also perceive the duration of such stimuli as being longer due to complexity of processing contrasting emotions.

The second experiment is unique in various respects. It is the first study to use music as an independent variable in emotional ambivalence research. Furthermore, it is also first in investigating the effect of emotional ambivalence on time perception. By doing so, this study establishes a link between two major research streams, time perception and emotional ambivalence. The study also explored the relationship between emotional ambivalence and information processing.

To conclude, this dissertation was written with the objective of making a meaningful contribution to the collective knowledge-base of consumer research. It explored the influence of music on various aspects of consumer behavior. It is hoped that future research will carry on from where this dissertation has left.

REFERENCES

Aaker, J., Drolet, A. & Griffin, D. (2005). Recalling Mixed Emotions. *Journal of Consumer Research*, 35 (Aug.), 268-278

Andrade, E. B. & Cohen, J. B. (2007). On the Consumption of Negative Feelings. *Journal of Consumer Research*, 34 (Oct.), 288-300

Apel, W. (1969). *Harvard Dictionary of Music*, Cambridge, MA: The Belknap Press of Harvard University Press

Bagozzi, P. R., Baumgartner, H. & Pieters, R. (1998). Goal-Directed Emotions. *Cognition and Emotion*, 12 (1), 1-26

_____ Gopinath, M. & Neyer, P. U. (1999). The Role of Emotions in Marketing. *Academy of Marketing Science*, 27, 184-206

_____ Wong, N. & Yi, Y. (1999). The Role of Culture and Gender in the Relationship Between Positive and Negative Affect. *Cognition and Emotion*, 13 (6), 641-672

Bee, C. C. (2005). Mixed Emotions: What if I Feel Good and Bad?. Unpublished Ph.D. Dissertation, University of Oregon, USA

Bickel, F. (1984). A Time:Velocity Ratio Investigation. *Journal of Research in Music Education*, Vol. 32 (2), 105-111

Block, R. A. & Reed, M. A. (1978). Remembered Duration: Evidence for a Contextural-Change Hypothesis. *Journal of Experimental Psychology: Human Learning and Memory*, 4, 656-665

_____ (1990). *Cognitive Models of Psychological Time*. Hillsdale, NJ: Erlbaum

_____ & Zakay, D. (2001). Psychological Time at the Millenium: Some Past, Present and Future Interdisciplinary Issues. in M. P. Soulsby and J. T. Fraser (eds.), *Time: Perspectives at the Millenium (The Study of Time X)*, pp.157-173, Westport, CT: Bergin and Garvey

Boltz, M. (1991). Time Estimation and Attentional Perspective. *Perception and Psychophysics*, 49 (5), 422-433

_____ (2004). The Cognitive Processing of Film and Musical Soundtracks. *Memory and Cognition*, Vol. 32 (7), 1194-1205

Brehm, J. W. & Miron, A. M. (2006). Can the Simultaneous Experience of Opposing Emotions Really Occur?. *Motivation and Emotion*, 30 (1),13-30

Brigner, W. L. (1986). Effect of Perceived Brightness on Perceived Time. *Perceptual and Motor Skills*, 63 (Oct.), 427-430

Brown, J. F. (1931). Motion Expands Perceived Time. On Time Perception in Visual Movement Fields. *Psychologische Forsch*, 14, 233–248.

Brown, S. W. (1995). Time, Change, and Motion: The Effects of Stimulus Movement on Temporal Perception. *Perception and Psychophysics*, 57 (1), 105–116

Bruner, G., C. (1990). Music, Mood, and Marketing. *Journal of Marketing*, 54 (4), 94-104

Cacioppo, J. T., Gardner, W. L. & Bernston, G. G. (1997). Beyond Bipolar Conceptualizations and Measure: The Case of Attitudes and Evaluative Space. in *Personality and Social Psychology Review*, 1 (Jan.), 3-25

Caldwell, C & Hibbert, S. A. (2002). The Influence of Music Tempo and Musical Preference on Restaurant Patrons' Behavior. *Psychology and Marketing*, 19 (11), 895-917

Cameron, M. A., Baker, J. P. & Braunsberger, K. (2003). The Effects of Music, Wait-Length Evaluation, and Mood on a Low-cost Wait Experience. *Journal of Business Research*, 56 (6), 421-430

Carstensen, L. L., Isaacowitz, D. M. & Charles, S. T. (1999). Taking Time Seriously: A Theory of Socioemotional Selectivity. *American Psychologist*, 54, 165-181

Chebat, J. C., Gelinas Chebat, C. & Filiatrault, P. (1993). Interactive Effects of Musical and Visual Cues on Time Perception: An Application to Waiting Lines in Banks. *Perceptual and Motor Skills*, 77 (3), 995-1020

Childers, T. & Houston, M. J. (1984). Conditions for a Picture-Superiority Effect on Consumer Memory. *Journal of Consumer Research*, 11 (2), 643-654

Cooper, G. & Meyer, L. B. (1960). *The Rhythmic Structure of Music*, The University of Chicago Press, Chicago

Curton, E. D. & Lordahl, D. S. (1974). Effects of Attentional Focus and Arousal on Time Estimation. *Journal of Experimental Psychology*, 103, 861-867

Darwin, C. (1871). *The Descent of Man, and Selection in Relation to Sex* (2 vols.), London: John Murray

Dowling, W. J. & Harwood, D. L. (1986). *Music Cognition*, Orlando FL: Academic press, Inc.

Eagleman, D. M. & Pariyadath, V. (2009). Is Subjective Duration a Signature of Coding Efficiency?. *Philosophical Transactions of The Royal Society*, 364 (1525), 1841-1851

Edell, J. A. & Burke, M. C. (1987). The Power of Feelings in Understanding Advertising Effects. *Journal of Consumer Research*, 14 (4) , 421-433

Fong, C. & Tiedens, L. (2002). Dueling Experiences and Dual Aöbivalences: Emotional and Motivational Ambivalence of Women in High Status Positions. *Motivation and Emotion*, 26 (1), 105-121

Fraisse, P. (1963). *The Psychology of Time*, New York, NY: Harper and Row

_____ (1984). Perception and Estimation of Time, *Annual Review of Psychology*, 35, 1-36

Gardner, M. P. (1985). Mood States and Consumer Behavior: A Critical Review. *Journal of Consumer Research*, 12 (Dec.), 281-300

Geissmann, T. (2000). Gibbon Songs and Human Music from an Evolutionary Perspective. In *The Origins of Music*, Wallin, N.; Merker, B. and Brown, S. (eds.), pp. 103-123, Cambridge, Massachusetts: MIT Press

Grondin, S. & Macar, F. (1992). Dividing Attention Between Temporal and Non-temporal Tasks: Preliminary Results of a Performance Operating Characteristic -POC- Analysis. In F. Macar, V. Pouthas and W. J. Friedman (eds.), *Time and Cognition*, Dordrecht: Kluwer Academic Publishers, pp. 119-128

Gundlach, R. H. (1932). A Quantitative Analysis of Indian Music. *American journal of Psychology*, 44 (Jan.), 133-145

Heckler, S. E. & Childers, T. L. (1992). The Role of Expectancy and Relevancy in Memory for Verbal and Visual Information: What is Incongruency?. *Journal of Consumer Research*, 18 (4), 475-492

Hevner, K. (1937). The Affective Value of Pitch and Tempo in Music. *American Journal of Psychology*, 44 (Oct.), 621-630

Hirschman, E. C. & Holbrook, M. B. (1982). Hedonic Consumption: Emerging Concepts, Methods and Propositions. *Journal of Marketing*, 46 (3), 92-101.

Holbrook, M. B. & Hirschman, E. C. (1982). The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun. *Journal of Consumer Research*, 9 (Sept.), 132-140

Hui, M. K., Dube, L. & Chebat, J. C. (1997). The Impact of Music on Consumers' Reactions to Waiting for Services. *Journal of Retailing*, 73 (1), 87-104

Isen, A. M. (1989). Some Ways in Which Affect Influences Cognitive Processes: Implications for Advertising and Consumer Behavior. In *Cognitive and Affective Responses to Advertising*, eds. Patricia Cafferate and Alice M. Tybout, Lexington Massachusetts: D. C., pp. 91-117

Janssens, W. & De Pelsmacker, P. (2006). How Do People React to Mixed Emotions in an Ad/Medium Context Setting? The Moderating Role of Discomfort with Ambiguity. *Advances in International Marketing*, 18, 63-93

_____ & Weverbergh, M. (2007). The Effect of Mixed Emotions in Advertising: The Moderating Role of Discomfort with Ambiguity. In Charles R. Taylor, Doo-Hee Lee (ed.) *Cross-Cultural Buyer Behavior (Advances in International Marketing, Volume 18)*, Emerald Group Publishing Limited, pp.63-92

Kahneman, D. (1973). *Attention and Effort*, N. Y.: Prentice Hall

Kellaris, J. & Kent, R. J. (1991). Exploring Tempo and Modality Effects on Consumer Responses to Music. *Advances in Consumer Research*, 18, 243-248

_____(1992). The Influence of Music on Consumers' Temporal Perceptions: Does Time Fly When You Are Having Fun?. *Journal of Consumer Psychology*, 1 (4), 365-376

Kellaris, J. & Altsech, M. B. (1992). The Experience of Time as a Function of Musical Loudness and Gender of Listener. In Sherry and B. Sternthal, eds. *Advances in Consumer Research*, 19, Provo, UT: Association for Consumer Research, 725-729

_____& Cox, A. D. & Cox D. (1993). The Effect of Background Music on Ad Processing: A Contingency Explanation. *Journal of Marketing*, 57 (4), 114-125

_____ & Rice, R. C. (1993). The Influence of Tempo, Loudness, and Gender of Listener on Responses to Music. *Psychology and Marketing*, 10 (1), 15-29

_____ & Kent, R. J. (1994). An Exploratory Investigation of Responses Elicited by Music Varying in Tempo, Tonality, and Texture. *Journal of Consumer Psychology*, 2 (4), 381-401

_____ & Mantel S. P. (1994). The Influence of Mood and Gender on Consumers' Time Perceptions. *Advances in Consumer Research*, Vol. 21, 514-518

_____ & Mantel, S. P. (1996). Shaping Time Perceptions with Music: The Effect of Congruity and Arousal on Estimates of Ad Durations. *Psychology and Marketing*, Vol. 13 (5), 501-515

_____ (2008). Music and Consumers. In *Handbook of Consumer Psychology*, Chris Haugvedt, Paul Herr, and Frank Kardes, eds., Mahwah, NJ: Erlbaum, 837-856

Kramer, T., Lau-Gesk, L. & Chiu, C-y. (2009). Biculturalism and Mied Emotions: Managing Cultural and Emotional Duality. *Journal of Consumer Psychology*, 19, 661-672

Kunej, D. & Turk, I. (2000). New Perspectives on the Beginning of Music: Archeological and Musicological Analysis of a Middle Paleolithic Bone Flute. In: N. Wallin, B. Merker, S. Brown (eds.), *The Origins of Music*, Cambrige MA, 235–268

Labouvie – Vief, G., De-Voe, M. & Bulka, D. (1998). Speaking About Feelings: Conceptions of Emotion Across the Life Span. In *Essantial Papers on the Psychology of Agin*g, L. M. Powell and T. A. Salthouse (eds.), New York: New York University Press, 481-510

Larsen, J. T., McGraw, P., Mellers, B. & Cacioppo, J. (2004). The Agony of Victory and Thrill of Defeat: Mixed-Emotional Reactions to Dissapointing Wins and Relieving Losses. *Psychological Science*, Vol. 15 (5), 325-330

_____ & Cacioppo, J. T. (2001). Can People Feel Happy and Sad at the Same Time?. *Journal of Personality and Social psychology*, 81 (Oct.), 684-696

Lee, A. Y. & Sternthal, B. (1999). The Effects of Positive Mood on Memory. *Journal of Consumer Research*, Vol. 26 (Sep.), 115-127

Levin, I. & Zakay, D (Eds.) (1989). Time and Human Cognition. *Advances in Psychology*, Series no. 59, Amsterdam: Elsevier / North-Holland

Lutz, K. A. & Lutz, R. J. (1977). Effects of Interactive Imagery on Learning: Applications to Advertising. *Journal of Applied Psychology*, 62 (4), 493-498

Macar, F., Grondin, S. & Casini, L. (1994). Controlled Attention Sharing Influences Time Estimation. *Memory and Cognition*, 11, 77-82

MacInnis, D. J. & Park, C. W. (1991). The Differential Role of Characteristics of Music on High and Low Involvement Consumers' Processing of Ads. *Journal of Consumer Research*, 18 (Sep.), 161-173

Madrigal, R. & Bee, C. (2005). Suspense as an Experience of Mixed Emotions: Feelings of Hope and Fear While Watching Suspenseful Commercials. *Advances in Consumer Research*, 32, 561-567

McClain, L. (1983). Interval Estimation: Effects of Processing Demands in Prospective and Retrospective Reports. *Perception and Psychophysics*, 34 (2), 185-189

Meyers-Levy, J. & Tybout, A. M. (1989). Schema Congruity as a Basis for Product Evaluation. *Journal of Consumer Research*, 16, 39-54

Milliman, R. E. (1982). Using Background Music to Affect the Behavior of Supermarket Shoppers. *Journal of Marketing*, 46 (Sum.), 86-91

_____ (1986). The Influence of Background Music on the Behavior of Restaurant Patrons. *Journal of Consumer Research*, 13, 286-289

North, A., Hargreaves, D. J. & Heath, S. J. (1998). Musical Tempo and Time Perception in a Gymnasium. *Psychology of Music*, 26, 78-88

North, A. C., MacKenzie, L. C., Law, R. M. & Hargreaves, D. J. (2004). The Effects of Musical and Voice Fit on Responses to Advertisements. *Journal of Applied Social Psychology*, 34 (8), 1675-1708

Oakes, S. (1999). Examining the Relationship Between Background Musical Tempo and Perceived Duration using Different Versions of a Radio Ad. *European Advances in Consumer Research*, 4, 40-44

_____ (2003). Musical Tempo and Waiting Perceptions. *Psychology and Marketing*, 20 (8), 685-705

_____ & North, A. (2006). The Impact of Background Musical Tempo and Timbre Congruity Upon Ad Content Recall and Affective Response. *Applied Cognitive Psychology*, 20, 505-520

Olsen, G. D. & Prajecus, J. W. (2004). Integration of Positive and Negative Affective Stimuli. *Journal of Consumer Psychology*, 14 (4), 374-384

Ono, F. & Kawahara, J. (2007). The Subjective Size of Visual Stimuli Affects the Perceived Duration of their Presentation. *Perception and Psychophysics*, 69, 952-957

Ornstein, R. E. (1969). *On the Experience of Time*. New York: Penguin Books

Otnes, C., Lowrey, T. M. & Shrum, L. J. (1997). Towards an Understanding of Consumer Ambivalence. Journal of Consumer Research, 24, 80-93

Pariyadath, V. & Eagleman, D. (2007). The Effect of Predictability on Subjective Duration. *PLoS ONE,* 2 (11): e1264.

Peck, J. & Childers, T. L. (2008). Effects of Sensory Factors on Consumer Behavior. In *Handbook of Consumer Psychology*, Chris Haugvedt, Paul Herr, and Frank Kardes, eds., Mahwah, NJ: Erlbaum, 837-856

Priester, J. R. & Petty, R. E. (1996). The Gradual Treshold Model of Ambivalence: Relating the Positive and Negative Bases of Attitudes to Subjective Ambivalence. *Journal of Personality and Social Psychology*, 71 (3), 431-449

Poynter, W. D. (1989). Judging the Duration of Time Intervals: A Process of Remembering Segments of Experience. In *Time and Human Cognition: A Life-Span Perspective* (ed. I. L. D. Zakay), 305–321, Amsterdam, The Netherlands: Elsevier

Roelofs, C. O. Z. & Zeeman, W. P. C. (1951). Influence of Different Sequences of Optical Stimuli on the Estimation of Duration of a Given Interval of Time. *Acta Psychologica*, 8, 89–128

Russell, J. A. (1980). A Circumflex Model of Affect. *Journal of Personality and Social Psychology*, 39, 1161-1178

_____ & Carroll, J. M. (1999). On the Bipolarity of Positive and Negative Affect. *Psychological Bulletin*, 125, 3-30

Ruth, J. A., Brunel. F. F. & Otnes, C. C. (2004). An Investigation on the power of Emotions in Relationship Realignment: The Gift Recipient's Perspective. *Psychology and Marketing*, 21, 29-52

Scherer, K. R. & Oshinsky (1977). Cue Utilization in Emotion Attribution from Auditory Stimuli. *Motivation and Emotion*, 1 (4), 331-346

Schiffman, H. R. & Bobko, D. J. (1974). Effects of Stimulus Complexity on the Perception of Brief Temporal Intervals. *Jornal of Experimantal Psychology*, 103, 156–159

Schmitt, B., Tavassoli, N. T. & Milliard, R. T. (1993). Memory for Print Ads: Understanding the Relations among Brand Name, Copy, and Picture. *Journal of Consumer Psychology*, 2, 55-81

Smith, P. C. & Curnow, R. (1966). Arousal Hypothesis and the Effects of Music on Purchase Behavior. *Journal of Applied Psychology*, 50, 255-256

Srull, T. K., Lichtenstein, M. & Rothbart, M. (1985). Associative Storage and Retrieval Processes in Person Memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 11 (2), 316-345

Sucala, M. (2011). Cognitive Mechanisms Involved in the Subjective Time Perception. PhD Dissertation, Babes-Bolyai University, Romania

_____ Scheckner, B. & David, D. (2010). Psychological Time: Interval Length Judgments and Subjective Passage of Time Judgments. *Current psychology letters*, 26 (2), 2-9

Thomas, E. A. C. & Brown, L. (1974). Time Perception and the Filled Duration Illusion. *Perception and Psychophysics*, 17, 449-458

Thompson, M. M., Zanna M. P. & Griffin, D. W. (1995). Let's not be Indifferent about Attitudinal Ambivalence. In *Attitude Strength: Antecedents and Consequences*, eds. Richard E. Petty and Jon A. Krosnick, Mahwah, NJ: Erlbaum, 361-386

Tse, P. U., Intriligator, J., Rivest, J. & Cavanagh, P. (2004). Attention and the Subjective Expansion of Time. *Perception and Psychophys*, 66, 1171–1189.

Unnava, H. R. & Burnkrant, R. E. (1991). An Imagery Processing view of the Role of Pictures in Print Advertisements. *Journal of Marketing Research*, 28 (2), 226-231

Van Stone, J. K. (1960). The Effects of Instrumental Tone Quality upon Mood Response to Music. In *Music Therapy*, ed. Erwin H. Schneider, Lawrence, KS: Allen Press

Wagner, R. (1964). Orchestra's Power of Speech; Analogy with Gesture. In *Wagner on Music and Drama: A Compendium of Richard Wagner's Prose Works*, A. Goldman and E. Sprinchorn (eds.), H. A. Ellis (trans.), Dutton: New York (Original work –*The Artwork of the Future*- published in 1849)

Watson, K. B. (1942). The Nature and Measurement of Musical Meanings. *Psychological Monographs*, 54 (2), 1-43

Webster, D. M. & Kruglanski, A. W. (1994). Individual Differences in Need for Cognitive Closure. *Journal of Personality and Social Psychology*, 67 (6), 1049-1062

Wedin, L. (1972). A Multidimensional Study of Perceptual-Emotional Qualities in Music. *Scandinavian Journal of Psychology*, 13 (4), 241-257

Williams, P. & Aaker J.L. (2002). Can Mixed Emotions Peacefully Co-Exist?. *Journal of Consumer Research*, 28 (4), 636-649

Xuan, B., Zhang, D., He, S. & Chen, X. (2007). Larger Stimuli are Judged to Last Longer. *Journal of Vision*, (7), 1-5

Yalch, R. F. & Spangenberg, E. R. (2000). The effects of Music in a Retail Setting on Real and Perceived Shopping Times. *Journal of Business Research*, 49 (2), 193-211

Zakay, D. (1989). Subjective Time and Attentional Resorce Allocation: An Integrated Model of Time Estimation. In I. Levin and D. Zakay (Eds.), *Time and Human Cognition: A Life Span Perspective*, Amsterdam: North Holland, 365-398

_____ (1990). The Evasive Art of Subjective Time Measurement: Some methodological Dilemmas. In R. A. Block (ed.) *Cognitive Models of Psychological Time*, Hillsdale, New Jersey: Erlbaum, 59-84

_____ & Block, R. A. (1994). An Attentional-Gate Model of Prospective Time Perception. In M. Richelle, V. De Keyser, G. D'Ydewalle, and A. Van Dierendonck (Eds.), *Time and the Dynamic Control of Behavior*, 167-178, Liège , Belgium: Universite de Liege.

_____ & Block, R. A. (1996). The Role of Attention in Time Estimation Processes. *Advances in Psychology*, 115, 143-164

_____ & Block, R. A. (1997). Temporal Cognition. *Current Directions in Psychological Science*, 6, 12-16

_____ & Block, R. A. (2004). Prospective and Retrospective Duration Judgments: An Executive-Control Process. *Acta Neurobiologiae Experimentalis*, 64, 319-328

_____ Nitzan, D. & Glicksohn, J. (1983). The Influence of Task Difficulty and External Tempo on Subjective Time Estimation. *Perception and Psychophysics*, 34, 451-456

Zhu, R. & Meyers-Levy, J. (2005). Distinguishing Between the Meanings of Music: When Background Music Affects Product Perceptions. *Journal of Marketing Research*, 42, 333-345