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THE POTENTIAL IMPACT OF MUSIC ON THE WEB-USER : THEORETICAL FRAMEWORK, RESEARCH AVENUES AND OBSTACLES.

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Abstract : More and more companies are building their own Web sites in order to sell their products or more simply to communicate. Despite this rush of the companies towards the electronic trade, research provides relatively few studies concerning the effectiveness of the elements of web site design. This article presents the potential impact of music on the behavior of Web users. The objective of this work is to show the need of investigations in this area of research. Moreover, the theoretical framework discussed allows the web designer to apprehend the musical element in a context of consumer behavior. The matter is based mainly on the results coming from the literature on music in advertising, psychology of music, and in-store music..

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Though many Web sites propose the hosting of products and advertising, certain authors note a tendency of companies to create their own sites to advertise and to sell their products (Ghoze and Dou, 1998). The fear of not being on the internet often overweighs the risk of a hastily and badly conceived presence (Berthon *et al.*, 1996) in such a way that action often precedes thought. Despite the explosion of the number of commercial Web sites, it should be noted that few academic works exist on the effectiveness of design elements of Web sites. The multi-media capacities of the web allowed the insertion of videos, colors, music but during the period when every company wanted to be "on the web", managers had few elements with which to take decisions concerning the features constituting the site. The present article examines the use of music in order to give reference marks and elements of reflection on the ways of using it in the construction of a commercial Web site.

The use of music in various contexts led researchers to question its influence on advertising and in stores. Though the two fields are far removed, their literatures show that conceptualizations of music and its impact in both are finally rather close. In this report, the idea defended is that the commercial Web site, as a media borrowing at the same time from advertising (communication of commercial and technical information) and sales (retail setting) can profit from the results of research on music in marketing. After a short presentation of the characteristics of the music and commercial Web sites, the potential impact of music is presented at various levels of the behavior of the consumer on the web. To conclude, the technological and legal obstacles confronted by the web designer who wishes to use music on his site will be discussed.

Music in advertising and in-store.

Many studies have examined how music can enhance advertising effectiveness and influence customers' in-store behavior (Galan, 1999; Rieunier, 1998, 1997; Gomy, 1995, Alpert and Alpert, 1990; Bruner, 1990). Music effect, even if it is not always perfectly explained, is unanimously recognized on all levels of the impact of advertising and all levels of purchasing behavior. On the cognitive level, the music can draw attention (Brooker and Wheathley, 1994), act on the processing of the advertised message, influence memorisation (Wallace, 1991), facilitate recall or recognition (Stewart and Furse, 1986; Stewart *et al.*, 1990), modify the perceived image of the store (Broekemier, 1993), of the services or the products (Areni and Kim, 1993). The music also has an emotional effect. It can involve a change of attitude or preference (Gorn, 1982; Alpert and Alpert, 1989…), a better appreciation of the service atmosphere (North and Hargreaves, 1996), to influence the purchase intention … On the behavioral level, it can influence the choice of a product (Gorn *et al.*, 1991), act on the pace of in-store traffic flow (Milliman, 1982), act on the time spent in-store (Smith and Curnow, 1966), on the amount of purchases (Milliman, 1982), on the quality of the purchases (Areni and Kim, 1993) and on impulse buying. (Sibéril, 1994).

The commercial Web site

Kassaye (1997) made an analogy between the advertisers which jump onto the web and the gold rush. This is often done, at the start, without a precise goal and Kassaye explains why the low cost of creation of a site as well as the low level of necessary competencies are the factors which push the companies to act, often without preliminary reflection. The companies wishing to have a presence on the web have the choice between several possible strategies. Nyeck and Houde (1996) present all the possible ones. These strategies go from the simple communication Web site to the true virtual store.

The communication Web site. In the majority of cases, the Web site is a showplace for a company, a brand, or a product. Web-based communication borrows some characteristics of press advertising (text, layout…) and television advertising (animations, music, video…). But, web communication also has its own characteristics. The communication can be adapted to each customer through the construction of a relevant database (Gunaratne, 1998). Moreover, the movement of information is no longer in a single direction, from company towards customer. The customer has an active role, he can seek himself the information which he finds most relevant to him. He is not a passive receiver as with televised advertising. The company must thus provide motivations to the consumer so that he visits the site.

The virtual store. The virtual store is a site where the consumers can see products, obtain information on these products and directly buy these products to then receive them at home. This place borrows many characteristics of the retail store. Indeed, the consumer must go there while typing the address in a browser, can walk around the various " aisles " to gather information on the products and possibly buy some. This " place of seduction " (Misse, 1996) also has its own characteristics. The consumer can obtain detailed information on all the products. This information can be technical (design features, price, reference) or more subjective (opinion of the users, advice of the webmaster…). Thanks to personalization tools, the consumer can be welcomed and be guided towards a place on the site which is particularly appropriate to him. Some sites thus make proposals of products on the basis of purchases already carried out by the visitor.

All the possibilities of this new media confront the researcher with many challenges and new ways of research. It is advisable to study which are the variables responsible for the effectiveness of a site and to determine the criteria of evaluation of this effectiveness. The increasing presence of music on the internet poses this feature as an element of design of which account will have to be held. Music effects start to be understood in a context of commercial communication or a context of in-store background. It is thus necessary to focus on the potential of music within the electronic trade context and on the research which could result from this.

Music on the internet

Music is a Web element whose development is favorised by its current situation both on the level of software which allows its diffusion and the laws which limit its use. This is because before being a marketing tool, music is an aesthetic object which is sold and which is consumed. Music is thus present on the web as an object of consumption which can be sold "on line" but which can be also exchanged in the form of computer files. Indeed, the sale of music is currently one of the most profitable and most important markets on the internet for it is particularly adapted to this type of trade. Moreover, the immaterial nature of music is appropriate to web distribution. However, in this immense flood of exchanged data, it is sometimes difficult, even impossible to control that royalties are systematically honored . Many are the sites which propose lists of music to be downloaded free or in exchange for music which are not present on the server. Thanks to a very high compression ratio, the mp3 format allows the remote loading of a complete album in sometimes less than one hour .

This broad use of music on the web encourages the manufacturers of software and hardware to find new solutions to improve diffusion quality and speed. Moreover, the problems involved in the payment of royalties and hacking requires more reflection on legal problems and accelerates the creation of new laws.

Music, design element of the commercial Web site.

The web is seen as a powerful medium making it possible at the same time to convey personalized information towards the user and to offer him the possibility to carry out purchases from a personal computer. Thus, Web site is both a retail environment and a communication medium. For a few years, research has tried to develop measurements of the Web site effectiveness. In the following, the influence of music is presented within a framework of consumer behavior. It emerges from a review of the literature that the web-user behavior results from internal responses to the commercial environment (the Web site), themselves moderated by individual variables (characteristic and situational). The following subject matter will be based on models of behavior taking account of the influence of the environmental variables (Kotler, 1974; Bitner, 1992 cf. figure 1). The reader will find in the appendix a summary chart of the results exposed in the following sections.

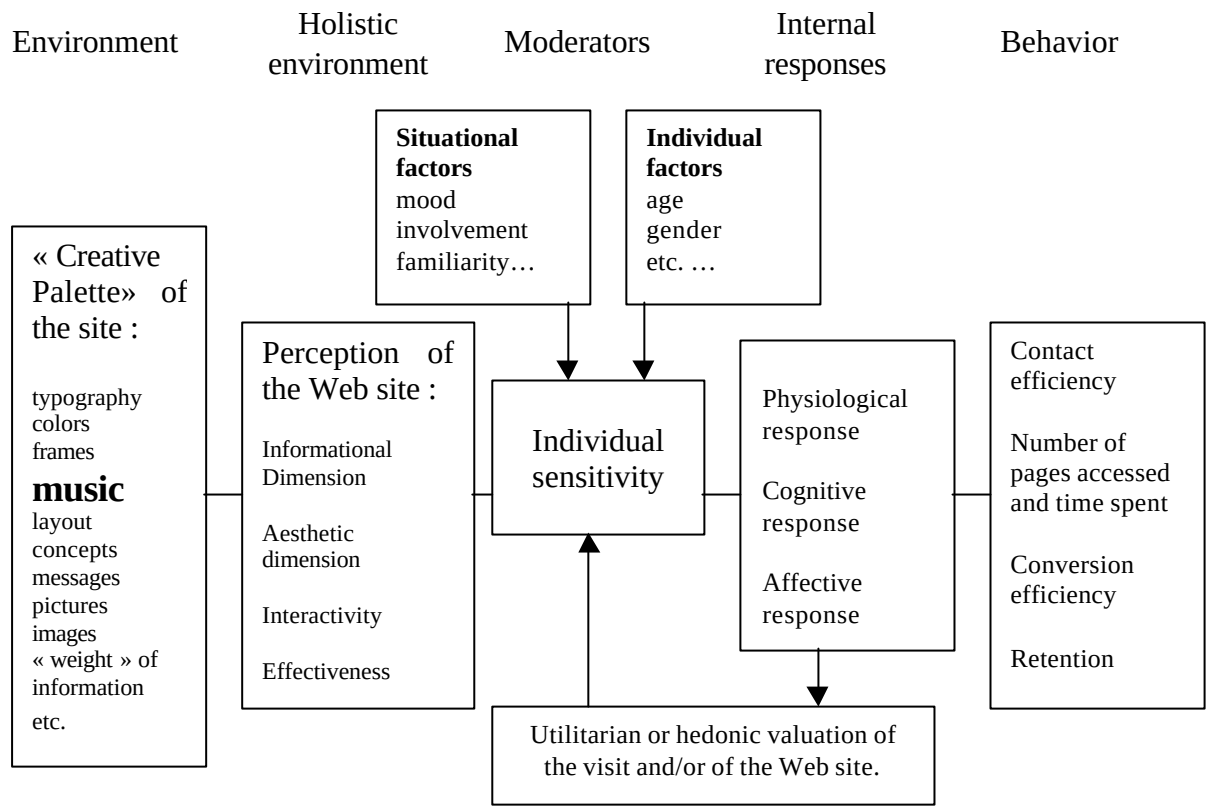

Figure 1 – Theoretical framework of Web site design elements' influence on the behavior of Web user inspired by Bitner (1992).

Impact of music on web-user behavior.

The advantage of the observation of web-user behavior on the commercial Web site is that it can be carried out under realistic conditions, without the knowledge of users. Indeed, the site can be conceived in such way that each action (measurable through mouse-clicks) is recorded in a log file which it is possible to analyze (Ferrandi and Boutin, 1999). Moreover, each browser systematically sends the server data about the user's software. From this capacity of collection of information, authors developed measurements of effectiveness. Berthon *et al.* (1996) defined a total index of effectiveness of the site based on the average of five measurements : awareness, locatability/attractability, contact efficiency, conversion efficiency and retention efficiency. For Dreze and Zufryden (1997), it is important to observe the number of visited pages and the time spent on the site because these variables translate the attraction of the site and the interest of the visitor.

Though the analogy between behavior on the Web site and in-store behavior must be taken with precaution, it is interesting to use the literature related to the use of in-store music. Donovan and Rossiter (1982) showed that behaviors such as the pleasure of shopping, subjects' desire to return, the money spent or the time spent in store could be influenced by the perception of the commercial setting.

Contact efficiency (Berthon et al., 1996). This is the question of transforming a hit (simple access to the site without awareness of information) into an active visit. The interface of the site must thus be sufficiently stimulating. The studies on music's impact in a commercial environment are often based on the theory of Mehrabian and Russel (1974) suggesting that behavior of individuals in response to the environment can be considered in terms of approach or avoidance. Smith and Curnow (1966) were the first to show that music, at high volume, could create a condition of avoidance. For Dubé *et al.* (1995), the music can have an effect on the desire to enter into interaction with the sales personnel. Though the comparison is weak, it is possible to expect that the music stimulates the desire to enter the site which is an interactive medium and which is thus a sales agent.

Number of pages accessed and time spent during a site visit (Dreze and Zufryden, 1997). These two measurements are closely interdependent for the visit lengthens as the number of visited pages increases. It is a question here also of considering the commercial Web site as an environment which can be approached or avoided. Milliman (1982, 1986) showed that the tempo of music could alter the pace of shopping and influence the time spent in-store. Smith and Curnow (1966) showed that a high sound volume could drive people to leave the store more quickly. Conversely, music could get the consumers to remain longer if it is appreciated (Yalch and Spangenberg, 1993) or if it is coherent with the sales environment.

Conversion efficiency (Berthon et al., 1996). The object is to find if the atmosphere of the decision can have an effect on the decision itself. Milliman (1982, 1986) confirms this assumption by showing that tempo can have an effect on store or restaurant average gross sales volume. Areni and Kim (1993) discover that musical style can modify the average amount spent per purchase. With regard to the decision to buy itself, Sibéril (1994) showed that pleasant music could increase impulse buying.

Retention efficiency (Berthon et al., 1996). How to transform a customer into a faithful customer? There are no studies having measured the impact of music on repurchasing or returning to the store. However, North and Hargreaves (1996) suggested that music appreciated by the customers of a cafeteria could increase their desire to return.

Behavior on a commercial Web site is the simplest variable to obtain and to process, because observation is a nonobstrusive method, which within the context of the internet is never skewed due to the presence of an observer. However, observable behavior is only the expression of the consumers' choices among the possible solutions corresponding to their needs (Filser, 1994). The literature on environmental psychology suggests that individuals react in an internal way to the physical surroundings and that these are the reactions which influence the behavior (Bitner, 1992).

Music and internal responses to the commercial Web site.

The Web site was initially considered by the advertising executives as a rational medium (Leong *et al.* 1998), effective to convey detailed information but with a weak capacity to stimulate the emotions. It seems that this tendency is reversed thanks mainly to technological progress which makes it possible for the site to use its multi-media potential whereas, for a long time, it could convey only text and static images. Korgaonkar and Wolin (1999) suggest that the web is used for many other reasons than the search for information. Their study shows that the first motivation of the web-user is to find gratification in using the Web as an escape from reality (" I can escape from reality ", " [the web] arouses my emotions and feelings " …).

Several types of variables are related to internal responses : satisfaction, attitude, memorization… Their measurement, in the context of a Web site, poses a problem for a bias is introduced since the data are collected via questionnaires which may be subject to a social desirability, and which can lack in external validity (Dreze and Zufryden, 1997). Beyond the problems of measurement of multidimensional concepts such as attitude, the effect of music on their cognitive, emotional or physiological antecedents was largely approached and the principal results are presented below.

Music and cognitive response. If the Web site proposes the sale on line of the company's products or not, it gives the web-user a certain quantity of technical or commercial information. The music impact on the information processing was often studied. The point of view often adopted in such research is that music enters in competition with the central message and people are unable to process information. (Park and Young, 1986; Anand and Sternthal, 1991). Music requires too many resources and the message cannot be well received. This can have several harmful consequences such as the reduction in the evaluation of the brand, (Anand and Sternthal, 1991) or lowering the memorizing of the message (Brooker and Wheatley 1994). Work of Olsen (1994, 1995, 1997) on the use of silence in advertising goes in this direction. Indeed, the author notices that when background music is stopped during an advertisement at the time of a particular information, this information is memorized better.

Stout and Leckenby (1988) suggested that certain musical elements would have more effect than others on information processing. It would be the case of mode (minor mode containing more information that major mode ; Wansink, 1992), tempo (accelerating the tempo increases the informational load ; Kellaris, 1992), volume (a high volume requires more resources ; Dowling and Harwood, 1986). Yalch and Spangenberg (1993) also showed that music modifies the perception of store positioning.

Music and affective response. The major idea is that music acts in a context of minimal involvement, in a peripheral way. In particular its effect is often considered according to the factors pleasure, activation and dominance of Mehrabian and Russel (1974). Gorn (1982) showed that a pen presented with an appreciated music could be preferred by the subjects. Though some did not succeed in replicating this experiment (Kellaris and Cox, 1987, 1989), many authors were interested in the emotional influence of the music. The principal results are that music character (happy, sad…) can influence the preference for a product presented with this music (Alpert and Alpert, 1989, 1991). Some authors isolated musical elements and affirmed that this positive affect is due to a major mode (Kellaris and Kent, 1992), to a high volume (Bruner, 1990), to a non-linear relationship to the tempo (Anand and Holbrook, 1986; Kellaris, 1992). On the in-store environment, Herrington (1993) succeeded in showing that the affect towards music can influence the mood which, in turn, influences the amount of money spent by the individual. Sibéril (1994) shows music's effect on the store evaluation and the number of purchases not envisaged through its effect on pleasure, but without effect of activation.

Music and physiological response. The Web site can involve certain physical reactions. Indeed, luminosity and sound volume are elements which the designer of the site can modulate and which have a physiological impact. Kellaris and Kent (1993) explain why the human body adapts to the sound in the same way that it deals it with the variations of light or temperature. The physiological reaction to the music in a marketing context is far from known. Dependent on activation, it mobilizes the physiological functions. It is probable that this answer is an antecedent of the sensory answer that Lacher and Mizerski (1995) define as a need to approach or withdraw from the source of the music or the source of tension associated with the music and which can result in physical movements (to tap foot, dance…). They showed that the sensorial response could have a positive impact on the need to reexperience the music. The impact of music on the pace of the in store traffic flow (Milliman, 1982) also seems to be related to the physiological response.

Individual sensitivity.

The responses to the environment are not the same ones for all the individuals. They are idiosyncratic. The individual sensitivity will be considered here as the inclination of the individual to react in a certain manner to the modifications of the environment (materialized here by the Web site design elements). This manner of reacting depends on the characteristics of the individual (sex, age…) and on situational factors (mood, moment of the day, temporal constraint, desires, familiarity with the environment…).

The concept of personal aesthetic sensitivity of Magne (1998) suggests that the individuals show certain tendencies as regards formal preferences, and aims at measuring the dominant aesthetic tendencies in the consumer. It is possible that such tendencies are also at the origin of various categories of web-users which emerge from the literature (Lewis and Lewis, 1997, Donthu and Garcia, 1999). Though nobody has yet examined this possibility, these categories also reveal differences in terms of individual characteristics and situational factors. A summary of what is currently known as regards musical influence according to individual characteristics and situations is exposed in the following paragraphs.

Age. Age can have an effect on the responses to the music. From a biological point of view, the explanation is that the faculties of information processing decrease with age. Therefore the addition of music in an advertisement would involve an overload of information which the old subjects would not be able to process (Gorn *et al.*, 1991; Cole *et al.*, 1995). Another explanation is that the musical tastes would tend to be decided during one rather short period of the individuals' life and which would correspond to a critical period of maximum sensitivity. From a sociological point of view, musical preferences might reflect consumers' periods of peak involvement with various social causes (protesting the Vietnam war…). Without determining the true origin - biological or sociological - of their results, Holbrook and Schindler (1989) show that the musical tastes tend to solidify at 23.47 years average age. Yalch and Spangenberg (1990, 1993) explain that the age, combined with musical style, can have an effect on the customers' shopping time perceptions.

Gender. Though there would be no significant differences between various categories of web-users in term of gender (Donthu and Garcia, 1999; Chébat, 1999), music has all the same an effect in interaction with this characteristic. It is thus foreseeable that the impact of a commercial Web site containing music will be different according to this criterion. For Kellaris and Altsech (1992), women react negatively to a high volume. The socio-psychological point of view of this phenomenon is related to the role of the sexes (Meyers-Levy, 1988). In fact, they would tend to answer in a positive way to a music which corresponds to the concept that they have of themselves (Kellaris and Rice, 1993). Females would have, moreover, tendency to respond more strongly in a sensory way (Lacher, 1994).

Culture. Day (1985), in a review of the literature on the musical tastes and concert attendance, notes that cultural institutions can play the part of agents in the transmission and the formation of musical tastes. She also notices that the socioeconomic status directs the experiments in such a manner that an individual will have a stronger exposure to certain types of music than to others. Englis *et al.* (1993a, 1993b) suggest that fans of a particular musical style react in a particular way to certain stimuli. For example, it appears that heavy-metal fans react more positively to violent stimuli than the non-fans. To consider the musical style (techno, rap, hard rock, jazz…) as a culture allows one to consider that certain elements imply others. Blair and Hatala (1992) notice that in advertising, rap music is often accompanied by characters of specific ethnic origins and specific behaviors (wearing cap and sport shoes, breakdance…). Sullivan (1990) explains that the type of audience of a radio can depend on the musical style diffused during the emissions.

Familiarity. If the familiarity of the web-user with the web in general can improve the use of the site, the relation of familiarity between the individual and music is not also clear. Indeed, on the cognitive level, it seems that a familiar music facilitates the message processing (Yoon, 1993) but also involves a lassitude which could lead to a negative emotional evaluation (Anand and Sternthal, 1991). Studies also showed the effect which positive or negative former associations made with the music could have on the evaluations of the products or brands presented with the same music (Baumgartner, 1992; Blair and Shimp, 1992). From a behavioral point of view, Yalch and Spangenberg (1990, 1993) suggested that the fact of listening to a familiar kind of music could increase the time spent in store.

Mood. Music is often used for its capacity to induce moods in the consumer (Alpert and Alpert, 1991). Indeed, certain studies show that, by its effect on mood, music can influence purchase intention (Alpert and Alpert, 1989). However, if music can influence mood, certain studies showed that moods of the consumer, before he is exposed to advertising, could moderate the musical influence. Thus, an individual in a good mood reacts to advertising more favorably than an individual in a bad mood. It should be noted that the gender of the individuals can moderate the impact of mood in such a way that women remember, better than men, elements related to a pleasant music, when they are in a good mood (Kellaris and Mantel, 1994). In general, it arises from the literature that women would be more affected than men by their states of mood. Kellaris, Mantel and Altsech (1996) explain that mood can affect the effect of musical volume over the perceived duration of a musical extract whereas it does not affect the effect of tempo over this same perceived duration.

Involvement. The process of behavior on the web lets one suppose a certain involvement since in any case, it is up to the web-user to find the site, to go there to recover information or to carry out purchases. In principle, the combined effect of involvement and music is harmful on the information processing (Muelhing and Bozman, 1990) because music is often regarded as a peripheral cue. However, Park and Young (1986) suggest - without managing to show it - that a high affective involvement would be a satisfactory condition for musical influence.

Congruency. Many studies have, these last years, examined the musical congruity in an advertising context or retail setting. The results show that incongruent information tends to be more difficult to encode and retrieve (Kellaris, Cox and Cox, 1993). In store, Rieunier (1998) explains that the perceived congruency between the music and the store can represent a mediating variable of the bond between music and responses of the individual and can thus modify the store evaluation.

Temporal pressure. The temporal pressure is one of the important constraints which weigh on shopping (Park *et al.*, 1989). In the context of the web, this constraint is all the more important since the user often pays for connection time . The music can have an effect on temporal perception. Indeed, the perceived duration of the exposure to a stimulus or an environment containing the music can be decreased by volume (Kellaris and Altsech, 1992) if the affect is neutral (Kellaris *et al.*, 1996), by the increase in musical complexity (Kellaris and Kent, 1992), by the mood induced by the music (Kellaris and Mantel, 1994), by the reduction of congruence with the other elements (Kellaris and Mantel, 1996), by the valence of the music (Hui *et al.*, 1997).

Music and perception of the Web site.

Music, like colors or typography, is one of the elements of the palette which the designer can use to give to the site its final form. It is the organization of these elements which will elicit the responses of the consumer. From this arrangement of stimuli several dimensions can emerge which are as many prisms through which each stimulus can be considered. The color of the background can be pleasant or not but can also form part of a color code and convey information. Within the framework of the literature on Web sites design (Napoli and Ewing, 1998; Ghoze and Dou, 1998; King *et al.*, 1998; Eighmey, 1997, Dreze and Zufryden, 1997), these dimensions which account for the arrangement of the elements composing the " creative palette "

of the site (ideas, music, colors, fonts...) are four: informational dimension, aesthetic dimension, interactivity and effectiveness. The elements of design are not related to only one dimension and the music can be considered along these four dimensions.

Informational dimension. This is the commercial, technical, objective or subjective information which will be communicated to the user. Though it was seen earlier that music can obstruct the processing of the message, it can also convey information. According to Hogg and Banister (2000), Gallopel (1998), Scott (1990), or Blair (1994), music can convey meaning. Baumgartner (1992) and Yoon (1993) explain that the meaning conveyed by the music is due to a certain organization of its structural elements (intramusical meaning) or to the association of the music with extra-musical elements (referential meaning). Yoon (1993) notes that the intramusical meaning is related to the emotions, for music, by its movements, would be able to represent emotions which the listener can recognize without experiencing himself. The referential meaning represents the musical symbols associated with the music by a process of cultural training through cinema, at the time of events (marriage, funerals…) or in everyday life. Thus, certain types of music, by convention, are always associated with the same events. Referential and intramusical meanings are interdependent because if it is obvious that it is by convention that some musical themes are meant to wake the soldier or pay homage to the dead, these themes are not interchangeable and each music creates an atmosphere preceding the direction that a convention gave it (Martin, 1978).

Aesthetic dimension. This is what Napoli and Ewing (1998) call the entertaining value of the Web site. It relates to layout, music, colors making the site more attractive. Music, before being a marketing tool is an aesthetic object of consumption and an objet d'art which forms part of everyday life. It is used in " dressing up " many environments where its function is to make them more pleasant. Certain authors insisted on the fact that music influences reactions to the stimuli and environments which contain music through its impact on the experienced pleasure (Morris and Boone, 1998). According to Lacher and Mizerski(1995) and Lacher (1994), the pleasure related to music is underlain by four basic hedonic responses: sensorial, emotional, imaginal, analytical.

Interactivity. For Ghoze and Dou (1998), interactivity is a multidimensional factor which, on the Web site, is expressed by interactive functions (they count 23 of them). In addition to the capacity of these functions to be addressed to a particular individual and to collect information on him, the interactivity is related to perceived relevance of information present on the site as well as to the involvement of the individual compared to this information (Napoli and Ewing, 1998; Eighmey, 1997). The interactive functions can make it possible for the site to allow the consumer to listen to a music corresponding to his tastes at the time of his visit. The fact that the consumer hears a music corresponding to his tastes at the time of his visit can increase his interest for the site. Sullivan (1990) showed that the advertisements are better memorized if they are inserted in a musical environment corresponding to the tastes of the audience. Moreover, music adapted to the consumer can increase the perceived relevance of information present on the Web site. It is what Iversen *et al.* (1989) show, suggesting that female subjects find a text more relevant when it is put to music.

Effectiveness. This relates to the optimization of programming scripts, file compression, so that the access to the site is fast. Part of this effectiveness escapes the designer because it is directly related to the quality of connection and the hardware of each user. Music can influence the effectiveness of the site for it represents an informational overload which is measurable in data-processing units (bytes) and can slow down the access to the site. Though no study exists concerning the effect of the music on this variable, it is important to quote King *et al.* (1998) for which the images present on the sites should not exceed a size of five Kilobytes under penalty of a significant deceleration of the access time to the site. The marketer wishing to use music on his commercial site web will have to thus measure if the problems encountered by the consumer from the reduction in the site effectiveness is compensated by the impact of the music value (informational, aesthetic, interactive) brought to the site.

For Bitner (1992), individuals, even if they are able to perceive the various stimuli, respond to their environment in a holistic way (i.e. that it is the total configuration of the stimuli which elicits their responses). Bensadoun-Medioni and Gonzalez (1999) explain why the shopping environment can be perceived according to two dimensions: utilitarian and hedonic. The utilitarian value of Web site is related to the elements which can obstruct or facilitate the collection of information, the choice of products, the purchase. The hedonic value is the festive, ludic and epicurean side (Babin *et al.*, 1994) of the site, which is more subjective and personal than its utilitarian counterpart. Bensadoun-Medioni and Gonzalez (1999) suggested that satisfaction is influenced by the value allotted to the site and depends on expectations of the consumers as well as situation. Thus an individual in a hurry would tend to privilege the utilitarian value. Certain individuals would be more in search of pleasant information, a need to escape (Korgaonkar and Wolin, 1999) and privilege the hedonistic value. The music can act on the utilitarian value of the site in two opposite directions. On the one hand, the fact of adding musical information involves a longer connection time, slows down the access to information and can even obstruct information processing. In addition, music can play a positive functional part by conveying meaning. The music also acts on the hedonic value of the site while making it more attractive, by charging it with emotions…

It was suggested in the preceding sections that music has a potential impact on all the stages of consumer behavior on a commercial Web site. It thus seems important to take this element into consideration in the strategy of the Web site design and to use it according to its effect envisaged on the behavior, the internal reactions and perceptions of the site according to individual and situational characteristics.

Obstacles.

Before concluding, it is necessary to warn the Web designer as well as the marketing scientist against the problems which appear in the use of music on Web sites. These problems, other than all the methodological problems involved in the observation and the measurement of the musical influence, are of two types: technological and legal.

Technological obstacles. Though progress is imminent as regards software for diffusion of music on the internet and as regards improvement of the quality of the network (in particular thanks to cabled connections, by satellite, ADSL), the time - too long - of remote loading of the music is a true obstacle today. As previously mentioned, that emphasizes the problems involved in the site effectiveness. There is an impact on the utility value allotted to the site since the access time to information is slower, as on the hedonistic value since the waiting time can be unpleasant. The size of the musical files is thus an element which the site designer must supervise.

Another technological obstacle is related to the user's hardware. On the one hand, the surfer can easily raise or lower the volume of the loudspeakers of his computer. This does not pose a problem in terms of evaluation of the site since - normally - the user carries out this volume correction according to his preferences. On the other hand, that condemns any measurement specifically related to the influence of volume on the behavior. In addition, the computer being often equipped with a CD player or music software, nothing prohibits the surfer from listening to different music that that diffused by the site. This completely prevents the control of the music influence in those cases.

Legal obstacles. Veyssière and Corone (1998) raise the legal problems involved in the use of music in advertising. The use of music within the context of the internet brings to light two difficulties reported by the authors: infringement with the moral right and the offense to the integrity of the copyrighted work. Indeed, the operation of the internet is such that no matter who can create a commercial Web site with few expenses and put in music as an element of the environment. If the music is composed by the interested party himself, the constraints are not important. On the other hand, the designer using an existing music is likely to have difficulty getting the rights to use the music.

The author of a piece of music created it to be it listened to as art. The use of it as an illustration of a commercial Web site inevitably does not respect the intentions of the author. Veyssière and Corone (1998) explain that the courts consider that the advertising use of a piece of music comprises an infringement of author's moral right. Moreover, the respect due the work implies maintaining its integrity. Any suppression or modification is thus prohibited. The technological problems involved in the use of music on the internet confront the designer with problems. Indeed, in order to accelerate the access to the site, the originator will seldom use a whole musical work but a short extract which will be played in a loop (repeated automatically). Moreover, in the same concern " of reducing " the musical file, the originator will compress it, i.e. will withdraw a certain quantity of information from it so that it is diffused more quickly. These two acts constitute a mutilation of the work and undermine its integrity.

The marketer will have to thus obtain the rights to use the work in an advertising context but also the right to modify it. Problems of this kind arise daily in the context of advertising but the difference is that on the web, the number of contracts and infringements becomes too large (everyone can make a site) so that each case can not be treated in an individual way within reasonable delay. However, given the explosion of the music on the internet (O' Brien, 1999) and the problems involved with hacking, it is a good bet that these technological and legal obstacles will disappear rather quickly.

Conclusion.

Without wanting to claim to be a complete treatment of the subject, this article presents the potential impact of music on consumer behavior in the context of a commercial Web site. This overall picture of the various stages of the behavior makes it possible to see how an element of the site design - music - can have effect on all levels of the process of decision-making. The objective of the article is to provide the designer of a commercial Web site with some elements for decision-making and to show the researcher the interest that there is to begin research in this field. Though certain methodological, technological and legal obstacles remain, the speed with which companies are leaping onto this new medium makes serious investigations necessary.

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Appendix : Table 1 – Summary of Relevant Research Involving Music.

Variables	Musical influence linked to the variable	Reference	Context*
Behavior			
Contact efficiency	loudness could create a condition of avoidance	Smith et Curnow (1966)	MS
	music influences consumers' desire to affiliate in buyer-seller interactions	Dubé *et al.* (1995)	MS
Number of pages accessed and time spent during the visit	tempo could influence the pace of shopping and the time spent in store	Milliman (1982, 1986)	MS
	less time was spent in stores with loud music	Smith et Curnow (1966)	MS
	consumers spent more time with liked music	Yalch et Spang. (1993)	MS
Conversion efficiency	slow tempo increases sales volume	Milliman (1982)	MS
	musical style could facilitate the selection of expensive products	Areni et Kim (1993)	MS
	liked music increases impulse buying	Sibéril (1994)	MS
Retention efficiency	liked music increases the desire to return	North et Hargreaves (1996)	MS
Internal Responses			
Cognitive response	presence of music reduces resource availability of central message processing	Park et Young (1986)	MA
		Anand et Sternthal (1991)	MA
		Olsen (1997)	MA
	minor mode increases stimulus complexity	Wansink (1992)	CA
	fast tempo increases stimulus complexity	Kellaris (1992)	CA
	high loudness increases stimulus complexity	Dowling, Harwood (1986)	PS
Affective response	music can affect product preferences	Gorn (1982)	MA
	major mode produces positive affect	Kellaris et Kent (1992)	PS
	there is a nonmonotonic relationship between tempo and affect varying with arousal	Anand et Holbrook (1986)	PS
		Kellaris (1992)	CA
	music-induced mood influences purchasing	Herrington (1993)	MS
	music pleasure influences store evaluation	Sibéril (1994)	MS
Physiological response	affective response is influenced by physical responses	Lacher et Mizerski (1995)	CM
	tempo can affect the pace of shopping	Milliman (1982)	MS
Individual sensitivity			
Age	older consumers have difficulty to process information presented with music	Gorn *et al.* (1991)	MA
		Cole *et al.* (1995)	MA
	musical tastes differ with the age of consumers	Holbrook et Sch. (1989)	CM
		Yalch et Spang. (1993)	MS
	there is an interaction between type of music and age of shopper on perceived time spent shopping	Yalch et Spangenberg (1990)	MS
Gender	high loudness has a negative effect on the affective evaluations of women	Kellaris et Altsech (1992)	CA
	females respond more positively to music that is congruent with their self-concept	Kellaris et Rice (1993)	CM
		Wansink (1992)	CA
	females respond more strongly to sensorial response (males : emotional and analytical resp.)	Lacher (1994)	CM
Culture	individuals with the same socioeconomic status are likely to have a higher exposure to certain music	Day (1985)	CA

Variables	Musical influence linked to the variable	Reference	Context*
Familiarity	familiar music facilitates message processing	Yoon (1993)	MA
	familiar music causes tedium	Anand et Sternthal (1991)	MA
	music associated with a positive event induces positive affect	Baumgartner (1992)	MA
	music associated with a negative event induces negative affect	Blair et Shimp (1992)	MA
	familiar music increases time spent in store	Yalch et Span. (1990, 93)	MS
Mood	music-induced mood influences attitude and purchase intention	Alpert et Alpert (1989, 1991)	MA
	females in a positive mood retrieve more stored information	Kellaris et Mantel (1994)	
Involvement	high involvement induces a negative effect of music	Muehling et Bozman (1990)	MA
	affective involvement enhances music's effect	Park et Young (1986)	MA
Congruency	music-message congruency influences the ease of message processing	Kellaris, Cox et Cos (1993)	MA
	music-store congruency affects store evaluation	Rieunier (1998)	MS
Perceived duration	high loudness increases perceived duration (PD)	Kellaris et Altsech (1992)	CA
	High complexity decreases PD	Kellaris et Kent (1992)	PS
	positive music-induced mood increases PD	Kellaris et Mantel (1994)	PS
	loudness (with positive affect) increases PD	Kellaris *et al.* (1996)	PS
	congruency (with low arousal) increases PD	Kellaris et Mantel (1996)	PS
	positive valence increases PD	Hui *et al.* (1997)	MS
Perception of the Web site			
Informational dimension	music can change beliefs	Gallopel (1998)	MA
	music conveys meanings	Scott (1990)	MA
	music conveys cultural symbols	Hogg et Banister (2000)	PS
Aesthetic dimension	pleasure related to music is underlain by four basic hedonic responses	Lacher (1994)	CM
		Lacher et Mizerski (1995)	CM
Interactivity	music affects perceived relevance of information	Iversen *et al.* (1989)	PS
	message is better memorized if music matches consumers' tastes	Sullivan (1990)	MA
Effectiveness	no studies focused on this topic		

*MS : music in stores or service environments.
MA : music in advertising.
CA : concert attendance.
CM : consumption/purchase of music.
PS : psychology or sociology of music.