

Pleasure, Arousal, Dominance: Mehrabian and Russell revisited

Iris Bakker · Theo van der Voordt · Peter Vink ·
Jan de Boon

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Abstract This paper presents a discursive review of the dimensions pleasure, arousal and dominance that Mehrabian and Russell developed in 1974 to assess environmental perception, experience, and psychological responses. Since then numerous researchers applied these dimensions to assess the experience of the physical environment and its perceived qualities. Although the dimensions appeared to be useful, there is a long-lasting debate going on among environmental psychologists about the interpretation of pleasure, arousal and dominance and its underlying mechanisms. Due to the lack of clarity researchers use different adjectives to describe environmental experiences, which makes any comparison between research findings difficult. This paper shows that the three dimensions can be linked to the current ABC Model of Attitudes: pleasure, arousal and dominance can be respectively related to affective, cognitive and conative responses, i.e. Affect, Cognition and Behaviour (ABC). In addition, connecting the three dimensions to the triad feeling, thinking and acting, can also help to improve our understanding, interpretation and measurement of pleasure, arousal and dominance. Based on this review, it is proposed to re-introduce the three dimensions and to replace the nowadays often used two dimensional model with pleasure and arousal by a three dimensional model, including dominance as a third dimension, to represent the complete range of human responses.

I. Bakker (✉)

Faculty Industrial Design Engineering, Delft University of Technology, Reijerskoop 94, 2771 BS
BoskoopDelft, The Netherlands
e-mail: iris.bakker@levenswerken.eu

T. van der Voordt

Faculty of Architecture, Delft University of Technology of Technology, Delft, The Netherlands
e-mail: D.J.M.vanderVoordt@tudelft.nl

P. Vink

Faculty Industrial Design Engineering, Delft University of Technology, Delft, The Netherlands
e-mail: P.Vink@tudelft.nl

J. de Boon

Researcher and architect, de Werkplaats GSB, Leiden, The Netherlands
e-mail: jandeboon@dewerkplaatsgsb.nl

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Introduction

An often applied approach to assess and describe environmental experiences is the environmental psychology method of Mehrabian and Russell (1974). They use three emotional dimensions - pleasure, arousal and dominance - to describe human perceptions of physical environments. In the last four decades, pleasure, arousal and to a lesser extent dominance have been used and are still used by numerous researchers in the field of environmental psychology (Bellizi et al. 1983; Bradley et al. 1992; Baker et al. 1992; Donovan et al. 1994; Dubé et al. 1995; Berleant 1997; Floyd 1997; Eastman 1997; Kaplan et al. 1998; Wirtz et al. 2000; Mattila and Wirtz 2001; Chebat and Michon 2003; Stamps 2003; Bigné et al. 2005; Laroche et al. 2005; Ryu and Jang 2007; Arifin and Cheung 2007; Kuppens 2008; Van Hagen et al. 2009; Morrison et al. 2011; Hyun et al. 2011). Pleasure and arousal are also applied in other disciplines such as the neurological and neuropsychological sciences (Bradley et al. 1992; Bonnet et al. 1995; Costa et al. 2010; Walter et al. 2011), marketing research (Menon and Kahn 2002; Laroche et al. 2005; Wu et al. 2008; Lin 2010; Ha and Lennon 2010; Penz and Hogg 2011), computer systems (Colomo-Palacios et al. 2011) and psychological research (Reisenzein 1994; Bradley et al. 2008).

In the field of environmental psychology, pleasure, arousal and dominance are conceived as three basic dimensions of emotional responses that indicate peoples' state of feeling (Mehrabian and Russell 1974; Russell 1980; Russell and Pratt 1980; Zajonc 1980; Russell et al. 1981; Bell et al. 2001; Gifford 2001). However, since 1974 discussions are going on among (environmental) psychologists such as Russell (1980), Russell and Pratt (1980), Russell et al. (1981), Russell and Lanius (1984), Russell et al. (1989), Russell and Carroll (1999), Russell and James (2003) and Zajonc and Markus (1984) about the exact interpretation of the dimensions in connection to cognition and affect and the role of dominance. Whereas based on a critical review of the literature including findings from recent studies conducted in England and Venezuela Yani-de-Soriano and Foxall (2006) show that dominance is as legitimate an environmental descriptor as pleasure and arousal, in much research less attention is paid to dominance or even not at all (Russell 1980; Russell et al. 1981; Chebat and Michon 2003; Mattila and Wirtz 2006; Kuppens 2008). In these studies models are used (see for example Fig. 1) with two axes: horizontally the degree of pleasure and vertically the degree of arousal.

Pleasure, Arousal and Dominance Revisited

In the literature a huge variety of different adjectives is used to operationalise pleasure, arousal and dominance. This makes research findings about the experience and perception of the physical environment difficult to compare. In order to gain a better understanding of the three dimensions, this paper analyses various adjectives related to pleasure, arousal and dominance that were applied by Mehrabian and Russell and other

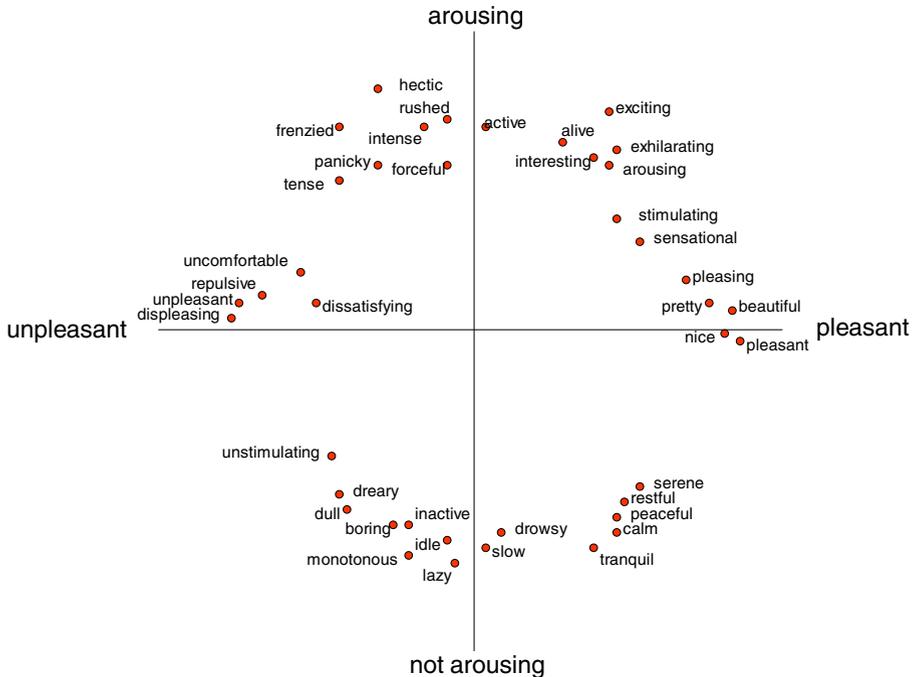


Fig. 1 Example of an environmental psychology model with two axes that shows various adjectives to indicate the level of pleasure (X-axis) and arousal (Y-axis) (Russell and Lanius 1984)

authors. Furthermore this paper explores the underlying mechanism in connection to the ABC Model of Attitudes i.e. a tripartite view with the three indicators affect, behaviour and cognition. As such it tries to answer the following questions:

1. What were the original operationalisations of pleasure, arousal and dominance defined by Mehrabian and Russell 1974?
2. How are pleasure, arousal and dominance being applied by other researchers?
3. What are the main causes for different applications?
4. Which underlying mechanisms and psychological phenomena can be found to improve our understanding of pleasure, arousal and dominance?

Interpretations by Mehrabian and Russell (1974)

Mehrabian and Russell introduced pleasure, arousal and dominance as three independent emotional dimensions to describe people's state of feeling. They conceived pleasure as a continuum ranging from extreme pain or unhappiness to extreme happiness and used adjectives such as happy-unhappy, pleased-annoyed, and satisfied-unsatisfied to define a person's level of pleasure. Arousal was conceived as a mental activity describing the state of feeling along a single dimension ranging from sleep to

frantic excitement and linked to adjectives such as stimulated-relaxed, excited-calm and wide awake-sleepy to define arousal. Dominance was related to feelings of control and the extent to which an individual feels restricted in his behaviour. To define the degree of dominance Mehrabian and Russell used a continuum ranging from dominance to submissiveness with adjectives such as controlling, influential and autonomous. Mehrabian (1996) mentioned the noun 'relaxation' as indicator for all three dimensions pleasure, arousal and dominance.

Comparison with the Factors Mentioned by Osgood et al

Mehrabian and Russell (1974) compared the three dimensions pleasure, arousal and dominance with the three factors evaluation, activity and potency used by Osgood et al. (1957) and Osgood (1963) (see Table 1). The first scientists who used these three factors were Solomon (1954) in analysing sonar signals and Tucker (1955) in his experiments judging paintings. Whereas both triads show some similarities, some dissimilarities come to the fore as well.

Pleasure <-> Evaluation

Mehrabian and Russell described pleasure purely in terms of positive or negative feelings. The evaluation factor applied by Osgood et al. (1957) is quite ambiguous. It is based on factor-analysis and linked to a broad spectrum of adjectives such as good-bad, optimistic-pessimistic, positive-negative, complete-incomplete and timely-untimely. Twenty years after their first joint paper on this issue, Mehrabian (1996) operationalised pleasure in a rather different way and used connotations such as excitement, relaxation, love, and tranquillity versus cruelty, humiliation, disinterest and boredom. Table 2 shows different interpretations of pleasure according to Mehrabian and Russell. The number of different interpretations in the literature of the term 'pleasure' is smaller rather than the terms 'arousal' and 'dominance'.

Arousal <-> Activity

Although Mehrabian and Russell (1974) conceived arousal as a feeling state, they applied primarily adjectives that concern mental activity. In 1977 they described arousal as ranging from sleep and intermediate states of drowsiness and alertness to frenzied excitement. However, in Mehrabian 1996 defined arousal as a combination of mental

Table 1 Relationships between the three dimensions used by Mehrabian & Russell and the three factors used by Osgood

Three dimensions mentioned by Mehrabian and Russell (1974)	Three factors mentioned by Osgood et al. (1957)
Pleasure	Evaluation
Arousal	Activity
Dominance	Potency

Table 2 Interpretations of pleasure by Mehrabian and Russell

Pleasure	
Affective (emotional) responses	Mehrabian and Russell 1974
Affective (emotional) responses	Russell and Mehrabian 1977
Pleasantness-unpleasantness is analogous to the semantic differential dimension of evaluation	Russell and Mehrabian 1977
Pleasure is a continuum ranging from extreme pain of unhappiness at the hand to extreme happiness or exstasy at the other hand	Russell and Mehrabian 1977
Positive versus negative affective states (e.g. excitement, relaxation, love, and tranquility versus cruelty, humiliation, disinterest, and boredom)	Mehrabian 1996

alertness and physical activity. He operationalised arousal by using adjectives ranging from sleep, inactivity, boredom and relaxation at the lower end to wakefulness, bodily tension, strenuous exercise and concentration at the high end. Osgood, Suci and Tannenbaum (1957) defined activity as attention and used adjectives such as fast-slow, active-passive, excitable-calm, hot-cold. In his vision activity has also ‘some relation to physical sharpness or abruptness as well’ (see also Osgood 1963). As such, Osgood used the activity factor for different types of activity, varying from physiological activity and mental activity to physical activity. Other authors used the activity factor in their research as well, with different interpretations (e.g. Lindsley 1951; Duffy 1957; Berlyne 1966, 1970; Thayer, R.E. 1967 et al. 1974; Bellizi et al. 1983; Mano 1992; Bigné et al. 2005; Ryu and Jang 2007). Lindsley (1951) and Duffy (1957) conceived activity as a physiological activity. Berlyne (1966, 1970) linked activity to attentiveness and connected activity to the arousal potential, known as the Wundt curve of 1874. This arousal potential concerns all types of stimulus properties that tend to raise alertness. Thayer, R.E. (1967) et al. (1974) used adjectives such as wide awake, aroused, aflame, impassioned, alert, and roused. Mano (1992) also related arousal to capacity. Table 3 shows different interpretations of pleasure by different researchers.

Dominance <--> Potency

Mehrabian and Russell (1974) connected dominance to feelings of control and behaviour restrictions caused by physical or social barriers. The adjectives they used to indicate a person’s level of dominance-controlling, influential, autonomous—are different from the adjectives used by Osgood et al. (1957) who described the potency factor by adjectives such as hard-soft, heavy-light, masculine-feminine, severe-lenient, strong-weak, tenacious-yielding. Thayer, R.E. (1967) et al. (1974) used potency in the same way as Osgood did. In Mehrabian 1996 interpreted dominance also in line with Osgood but he used different adjectives such as anger, relaxation, power and boldness versus

Table 3 Interpretations of arousal by different researchers

Arousal	
Arousal potential related to novelty, complexity and familiarity	Wundt (1874) in Berlyne 1970
Arousal connected to attentiveness; relation between arousal and exploratory activities evoked by novel, complex and ambiguous stimuli. Arousal level concerns wide-awake, attentive, excited,	Berlyne 1966
Arousal described in terms such as: wide awake, aroused, aflame, impassioned, alert, roused.	Thayer 1967 in Russell 1979
Arousal potential related to novelty, complexity and familiarity with additional intervening mechanisms such as boredom	Berlyne 1970
Activity factor	Mehrabian and Russell 1974
Initially proposed to account for the intensity, but not the quality or direction, of a behavior	Mehrabian and Russell 1974
Feeling state varying along a single dimension ranging from sleep to frantic excitement such as stimulated, relaxed, excited and sleepy	Mehrabian and Russell 1974
Affective (emotional) responses	Russell and Mehrabian 1977
The arousal dimension is analogous to the semantic differential dimension of activity	Russell and Mehrabian 1977
Responsiveness	Russell and Mehrabian 1977
Arousal ranges from sleep through intermediate states of drowsiness and then alertness to frenzied excitement at the opposite extreme.	Russell and Mehrabian 1977
Relation with attentional capacity	Mano 1992
Level of mental alertness and physical activity. (e.g. sleep, inactivity, boredom, and relaxation at the lower end versus wakefulness, bodily tension, strenuous exercise, and concentration at the higher end).	Mehrabian 1996
Activity of activation	Russell and Carroll 1999
Arousal items: active, alert, attentive, excited.	Russell and Carroll 1999

anxiety, infatuation, fear and loneliness. Table 4 shows different interpretations of dominance according to different researchers.

Reflections on Possible Causes of Different Applications and Interpretations

The different applications and interpretations might be due to different ideas about how people perceive and assess their environment and how this is expressed in their individual internal representations. A third issue that points out to differences between the three dimensions of Mehrabian and Russell and the three factors of Osgood et al. can be found in different levels of explained variance.

Table 4 Interpretations of dominance by different researchers

Dominance	
Dominance described as dominant, controlling, influential, important, autonomous; submissiveness described as: submissive, controlled, influenced, awed, guided (in Russell 1979)	Thayer 1967
Connected to behavior such as controlling, influential, autonomous	Mehrabian and Russell 1974
Potency	Russell and Mehrabian 1977
Ranges from feelings of total lack control or influence on events and surroundings to the opposite extreme of feeling influential and in control.	Russell and Mehrabian 1977
A third factor is not only dominance, but a number of dimensions such as locus of causation, importance of the emotion, and locus of control. These dimensions are interpretable as cognitive rather than affective	Russell (1978) in Russell and Pratt 1980
Perceptual cognitive dimension	Russell and Pratt (1980)
Perceptual cognitive dimension	Russell et al. 1981
A feeling of control and influence over ones's surroundings and others versus feeling controlled or influenced by situations and others (e.g., anger, relaxation, power, and boldness versus anxiety, infatuation, fear, and loneliness)	Mehrabian 1996

Affect and Cognition

Russell and Pratt 1980; Russell et al. 1981, 1989; Russell and Lanius 1984; Russell and Carroll 1999; Russell and James 2003 and Zajonc and Markus (1984) conceived pleasure and arousal as indicators of affect, and considered dominance to be a more cognitive indicator (Russell and Pratt 1980; Russell et al. 1981). In environmental psychology research affect is a central theme (Russell and Pratt 1980; Baker et al. 1992; Ang and Leong 1997; Chebat and Michon 2003; Ryu and Jang 2007). According to Ulrich (1983), “*Affect is central to conscious experience and behaviour in any environment, whether natural or built, crowded or unpopulated. Because virtually no meaningful thoughts, actions, or environmental encounters occur without affect*”. In addition, the cognitive component is of considerable value in experiencing the physical environment as well, because a building has a function and a meaning with a cognitive recognition (Ittelson 1973; Russell and Pratt 1980; Russell 1980; Russell et al. 1981). Mehrabian (1996) used the term ‘disinterest’ as a noun to explain pleasure. This term concerns primarily a mental effect that is related to cognition. In 1974 Mehrabian and Russell described arousal as a mental activity in terms of ‘a dimension ranging from sleep to frantic excitement’. Due to their references to Berlyne (1966, 1970) and Thayer, R.E. (1967) et al. (1974) and the adjectives Mehrabian and Russell used, such as stimulated, excited and wide awake, it can be concluded that arousal refers to a cognitive and not to an affective factor. This is in contrast to their original description of arousal as a state of feeling, but in accordance to the mental terms Mehrabian

and Russell used in 1977, namely responsiveness and alertness. Russell and Carroll (1999) linked 'activity' to adjectives such as alert, attentive and excited which are all focused on mental activity and as such refer to a cognitive response. Arousal explained by nouns such as attentiveness, awokeness and alertness has also to be conceived as a mental processor and a cognitive factor that may contribute to physiological activity. Whereas Mehrabian and Russell (1974) interpreted arousal as an affective factor, it shows to be a cognitive one that can be connected with thinking and thoughts. Regarding dominance, it can be questioned whether dominance has to be conceived as affective or cognitive, and how to measure this dimension (Russell and Pratt 1980; Russell et al. 1981). In the literature dominance is consequently related to freedom or limitations regarding someone's behaviour. This means that dominance is neither affective, nor cognitive, but conative.

Stimulus or Response

The dimensions pleasure, arousal and dominance used by Mehrabian and Russell describe the state of feeling of the observer and as such concern a response, whereas the factors evaluation, activity and potency used by Osgood concern a judgment of the appearance of the (physical) environment and as such represent a stimulus. For instance the evaluation factor of Osgood represents a rather evaluative and contemplative dimension and values the positive and negative characteristics of the stimulus. This means that evaluation and pleasure can be considered as different terms with different interpretations. Mehrabian and Russell (1974) linked arousal to mental activity ranging from sleepy to excited, while Osgood described activity with stimulus characteristics such as fast-slow and warm-cold, and physical aspects such as sharpness or abruptness. Mehrabian and Russell (1974) used the dimension dominance to express the degree of restriction of behaviour i.e. to responses, whereas Osgood did not directly link his potency factor to behaviour but interpreted potency as a factor to describe aspects of general nature like hard-soft and heavy-light. As a consequence, dominance and potency are not comparable as well. Later on, Russell et al. (1981) considered dominance also as more related to the stimulus.

Different levels of Explained Variance

A third indication of incomparability between Mehrabian and Russell and Osgood et al. can be found in the different proportions of variance. According to Russell et al. (1981), both pleasure and arousal account for a large proportion of variance, whereas dominance showed a small percentage of explained variance (Russell 1980; Russell and Pratt 1980; Russell et al. 1981). This might be due to the fact that dominance was not clearly interpreted and defined by an unclear mix of adjectives. Due to the low contribution to explained variance, many researchers do not pay attention to the influence of the dominance dimension. However, Osgood mentioned 'evaluation accounting for approximately double the amount of variance than potency or activity, these two in turn being approximately double the weight of any subsequent factors'.

Apparently, potency did not have a low proportion of explained variance, whereas dominance did. It thus can be concluded that potency and dominance are different dimensions. Overall it can be concluded that serious differences exist between the triple pleasure, arousal and dominance and the triple evaluation, activity and potency.

In Search of Underlying Mechanisms of Pleasure and Arousal

In order to be able to understand the relationship between environmental characteristics (stimuli) and the way people experience these characteristics (responses) and to clarify what actually happens in the mental processes between stimuli and response, this section discusses possible underlying mechanisms of pleasure and arousal. Figure 2 shows a diagram that is often used to valuing the physical environment by the dimensions pleasure and arousal (Russell 1979, 1980; Mano 1992; Barrett and Russell 1998; Knez and Hygge 2002). Our assumption is that the centre (the grey square) represents the conditions which people experience as harmonious. The outside area shows the area of disharmony, whereas the area in between shows the transition zone. A very low degree of pleasantness will cause feelings of disharmony; whereas too much pleasantness may also cause feelings of disharmony as people get lazy and bored without any challenges (Soesman 2005). A very low degree of arousal makes people feel drowsy and a very high degree of arousal makes them highly agitated (Kandel et al. 2000).

An underlying mechanism to explain pleasure and arousal might be the degree of order and variation. Regarding the environment, anthropologists make a distinction between the ‘planet’ which is shaped by natural forces and the ‘world’ which is built by human effort (Csikszentmihalyi and Rochberg/Halton 1981). Both in the planet and the world an identical phenomenon can be observed: living creatures and man-made things

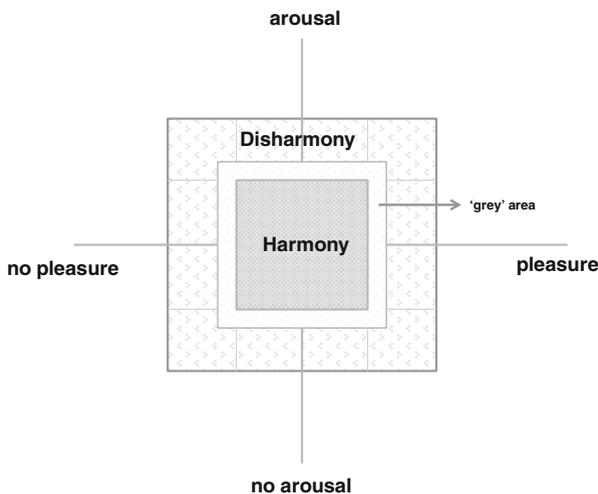


Fig. 2 Pleasure and arousal as indicators for harmony and disharmony in the physical environment (Bakker and de Boon 2012)

can be recognized although all creatures and things are unique. Every oak for instance is unique and a particular building always differs from any other building. They both belong to a particular concept or archetype with a particular order (Goethe 1981; Bortoft 2010). Due to these concepts recognition is possible. We recognize any oak as an oak and we recognize any building as a building. Within these concepts, variations occur, both in planet and in world, which results in different appearances of the concepts caused by specific conditions and contexts. For the planet for instance, every oak shows a unique appearance while all features of this particular oak can be attributed to the oak concept. Also in the world due to the existence of concepts, recognition is possible as for instance the concepts of the old Egypt or the Islam, while the appearances of a particular Egyptian pharaoh image or a specific Islamite mosque all are unique. It can be concluded that the physical environment comes up with two characteristics: order based on concepts and variations as a result of unique conditions and contexts. The way we experience the environment depends on the degree of order and variation (Van Wegen 1970; Steffen 1980).

Figure 3 shows the degree of order (horizontal axis) and variation (vertical axis) in connection to the experience of harmony and disharmony. An environment with a well-balanced level of order and variation (the grey square in Fig. 3) will be experienced as an harmonious environment (van Eyck 1962). The outside area shows the area of disharmony: a too low degree of order means chaos, whereas too much order means rigidity (Schneider 1987). A low degree of variation evokes dullness and a high degree means overstimulation. The area in between shows the transition zone. Although the axes in Figs. 2 and 3 are different, both grey squares represent a positive response. Our assumption is that judgments of individuals regarding degrees of dominance and arousal can be linked to the degree of order and variation of the physical environment. If this assumption is true, the level of order and variation can explain why people get pleased and how the feeling state of the observer is influenced by environmental features.

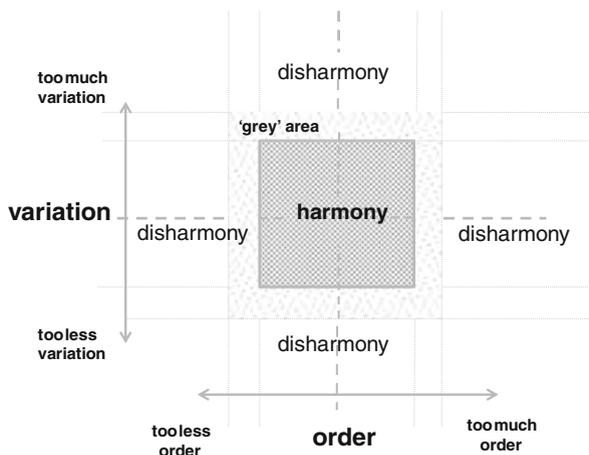


Fig. 3 The degree of order and variation as indicators for harmony and disharmony in the physical environment (Bakker and de Boon 2012)

Another psychological phenomenon that influences pleasure and arousal are our expectations (Steffen 1972; Wilson et al. 1989; Vonk 2003). Expectations can also be related to order and variation. During a lifetime people get accustomed to concepts and people build up recognitions which form people's expectations. Psychological evidence shows that affect induces when people recognize things even when they are not aware of their recognitions (Zajonc 2001). Deviations of expectations lead to arousal (Vonk 2003). A positively experienced deviation leads to pleasure and a negatively experienced deviation leads to displeasure (Vonk 2003). It is hypothesized that expectations are connected with learnt habits and mental representations (Vonk 2003) and behaviour and as such are connected to the dimension dominance.

Connections with General Theories in Psychology

In 1960 Rosenberg and Hovland developed the so-called ABC-psychology that adds behaviour as a third dimension, in addition to affect and cognition. This tripartite view includes behaviour as a conative dimension (Allport 1940; Wolff and Baumgarten in Hilgard 1980; Arriaga and Agnew 2001; Gerdes and Stromwall 2008). Since then, many authors pay attention to the interrelated role of affect, cognition and behaviour (Ostrom 1969; Breckler 1984; Knopf 1987; Fiedler and Forgas 1988; Polivy 1998; Gabriel and Gardner 1999; Thompson and Fine 1999; Farley and Stasson 2003; Stangor 2013). The ABC psychology demonstrates a strong affinity with the three functions of the soul that were already mentioned by Plato: feeling, thinking and acting. The distinction between feeling, thinking and acting is used since a long time until nowadays as a common view on psychological experience, e.g. by Wolff (17th century); Baumgarten (18th century), Bain (1864), Allport (1940), Smith (1947), Harding et al. (1969), Katz and Stotland (1959), Rosenberg et al. (1960), Ostrom (1969), Brodwin (1976), Ajzen (1989), Hilgard (1980), Breckler (1984), Kay (1993), Arriaga and Agnew (2001), Jorgensen and Stedman (2001), Van de Grind (2004), Sno (2008), and Gerdes and Stromwall (2008). According to this view, people show three types of responses while interacting with stimuli: affect behaviour and cognition (ABC factors). These experiences lead to feelings, thoughts and/or acting (Ostrom 1969; Brodwin 1976; Schneider 1987; Ajzen 1989; Kay 1993; Arriaga and Agnew 2001; Van de Grind 2004; Covey 2005; Smidts 2002; Csikszentmihalyi 1999). Asking people about their experiences results in expressions such as verbal statements of affect, perceptual responses and verbal statements of belief (cognition) and reports of behavioural intentions and commitment (Ostrom 1969; Jorgensen and Stedman 2001).

The ABC trilogy shows similarities with the three response dimensions of Mehrabian and Russell. Pleasure corresponds with affect. Arousal appeared to express cognition. When dominance is interpreted as Mehrabian and Russell originally did, dominance refers to the degree in which people experience their environment as being restrictive versus supporting to the way they want to act, their drives and their behaviour. As such, dominance represents a conative dimension, a term that Mehrabian and Russell did not use. Table 5 shows the

Table 5 Connections between the three dimensions of Mehrabian & Russell, the three factors of Osgood, the tripartite ABC-psychology and the triad mentioned by Plato

Three dimensions mentioned by Mehrabian & Russell to describe human responses	Three factors mentioned by Osgood to describe stimuli	ABC-psychology	Plato
Pleasure	Evaluation	Affect	Feeling
Arousal	Activity	Cognition	Thinking
Dominance	Potency	Behaviour (Conation)	Acting

relationships between the original three dimensions of Mehrabian and Russell (1974), the three factors of Osgood et al. (1957), the ABC psychology and the three functions of the souls according to Plato.

Conclusion

This paper demonstrated that the original ideas of Mehrabian and Russell (1974) about pleasure, arousal and dominance can be connected to the ABC psychology and the distinction between feeling, thinking and acting that is used since ages and are still useful to describe environmental experiences. Both tripartite views bring us back to the first models in environmental psychology that included the dominance dimension as well, but now based on a better understanding of all three dimensions. For this reason it is suggested to replace the often used two dimensional model with pleasure on the horizontal axe and arousal on the vertical axe (see Fig. 1) by a three dimensional model with dominance on the third axe (see Fig. 4).

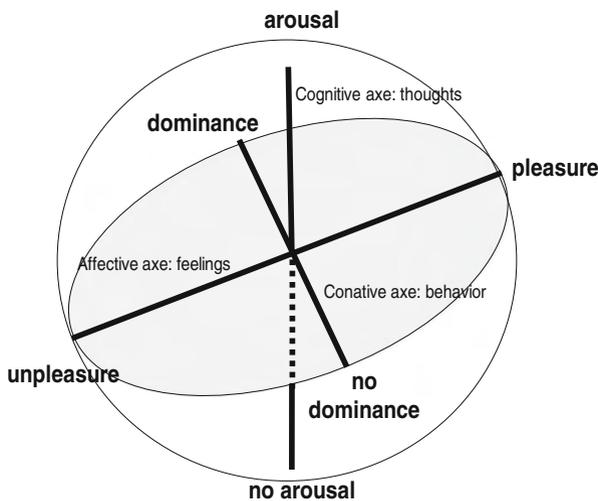


Fig. 4 Three dimensional model of pleasure, arousal and dominance as tripartite view of experience (Bakker and de Boon 2012)

Although different interpretations of pleasure, arousal and dominance can be found in literature, the original meanings developed by Mehrabian and Russell in 1974 are still valid. In future research pleasure and arousal have to be conceived as respectively affective and cognitive concepts and dominance as a conative concept. Regarding dominance, many researches showed the importance of feelings of control related to behaviour (Seligman 1975; Frijda 1988; Gaillard 2003) and health (Johnson and Hall 1988; Furda et al. 1994; Warr 1994; Gaillard 2003; De Lange et al. 2003, 2004). These aspects were also mentioned by Karasek and related to workload and stress in his model together with Theorell in 1990 (in Gaillard 2003). In research concerning topics such as picture processing (Bradley and Lang 1994) or defining the effects in advertising (Morris et al. 2002) the dimension dominance plays an important role as well. It is recommendable that also in environmental psychology dominance is conceived as an influential factor which deserves serious attention and that this dimension will be rehabilitated. Additional research is needed to validate the proposed three dimensional model. In current research a new list of adjectives is being tested on its applicability to measure the perceptual qualities of a meeting room (Bakker et al. A framework to select adjectives for a uniform assessment of the physical environment, forthcoming). The first findings confirmed the relevance of the triple pleasure, arousal and dominance.

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