



## The middle of the road: Perceiving intermediates



Ivana Bianchi<sup>a,\*</sup>, Roberto Burro<sup>b</sup>, Stefania Torquati<sup>c</sup>, Ugo Savardi<sup>b</sup>

<sup>a</sup> Department of Humanities, University of Macerata, Italy

<sup>b</sup> Department of Philosophy, Education and Psychology, University of Verona, Italy

<sup>c</sup> Department of Educational Sciences, University of Macerata, Italy

### ARTICLE INFO

#### Article history:

Received 13 July 2012

Received in revised form 8 February 2013

Accepted 20 May 2013

Available online 21 June 2013

#### PsycINFO classification:

2323 Visual Perception

2340 Cognitive Processes

#### Keywords:

Intermediates

Opposites

Spatial properties

Bipolar dimensions

Grounding cognition in perception

### ABSTRACT

This article aims to study the extension and immediacy of the perception of intermediates during the observation of images showing a variation in a spatial property from one extreme (e.g. *at the top* of a mountain) to the opposite extreme (e.g. *at the bottom* of a mountain). Three experiments were carried out: rating tasks were used in studies 1 and 3 and a classification task in study 2.

Three main results emerged. The first result (concerning extension) is that people consistently recognize some instances of a dimension as intermediates (*neither a... nor b*) rather than as one or the other opposite pole (*a, b*). The number of these cases ranges from one to most of the experiences in between the two extremes, depending on the type of opposite considered. The second result (concerning immediacy) is that recognizing and rating intermediates did not take longer in most cases than recognizing and rating the two poles. The third result (concerning task influence) is that there were differences due to the type of task, i.e. rating and classification. The implications of these results are discussed within the framework of theories grounding cognition in perception.

© 2013 Elsevier B.V. All rights reserved.

### 1. Introduction: intermediates and the cognitive structure of opposites

Antonymy is one of the relationships which has been studied most frequently by linguists due to its great importance in everyday language (Cruse, 1986; Lyons, 1977; Murphy, 2003). This importance has also been acknowledged in recent approaches to the subject in the field of cognitive linguistics: “It is well-known to both lay people and researchers interested in the meaningful functioning of language that antonymy (...) as a binary contrast used in order to express opposition, is a commonplace in all kinds of communicative modalities and registers: written as well as spoken, fact as well as fiction and formal as well as informal. Antonymy is also important in the design of iconic signs, such as traffic signs, and in visual works of art of different kinds (Giora, Heruti, Metuki, & Ofer, 2009)...” (Paradis & Willners, 2011). Everyday behavior is regulated by this relationship, more than one might realize: “Try visiting a public lavatory without checking which is the ‘gents’ and which is the ‘ladies’. On your way out, ignore the instructions which tell you whether to ‘push’ or to ‘pull’ the door. And once outside, pay no attention to whether traffic

lights are telling you to ‘stop’ or ‘go’. At best, you will end up looking very foolish; at worst, you will end up dead” (Jones, 2002, p. 7). Even speakers innocent of semantic theory have robust intuitions about lexical opposites, and children rapidly catch on to the idea at an early age (Croft & Cruse, 2004). The importance of opposition in cognition emerges in pre-linguistic phases of human development (see Casasola, 2008; Casasola, Cohen, & Chiarello, 2003; Quinn, 2005).

This primacy and pervasiveness might be due to the fact that opposition is a relationship rooted more in perceptual than linguistic structures and a new investigation of opposites based on this hypothesis has been put forward (Bianchi & Savardi, 2008a, 2012; Bianchi, Savardi, & Burro, 2011; Bianchi, Savardi, & Kubovy, 2011; Savardi, 2009). There are a number of new questions being asked. For example: is there evidence, on the level of perceptual judgments, that two contraries lay on a common underlying dimension (Bianchi, Savardi, & Burro, 2011)? Is the range of experiences which are perceived as belonging to one pole more extensive or topologically different from the other pole (Bianchi, Savardi, & Kubovy, 2011)? What are the transformations of a given object which are immediately recognized as generating its opposite (Bianchi & Savardi, 2006; Bracco, Bianchi, Chiorri, Burro, & Savardi, 2009)? And are there experiences that we perceive as ‘neither a, nor b’, and, if so, what is their status? This paper focuses on the last question. It deals with experiences which are in between two poles but *are not perceived as gradations of one or*

\* Corresponding author at: Department of Humanities, Section: Philosophy and Human Sciences, University of Macerata, Via Garibaldi, 20, 62100 Macerata, Italy. Tel.: +39 0733 258 4320.

E-mail address: [ivana.bianchi@unimc.it](mailto:ivana.bianchi@unimc.it) (I. Bianchi).

the other pole, being rather recognized as neither of them – and we will refer to these throughout the paper using the term ‘intermediates’.<sup>1</sup>

Informal observations provide plenty of evidence that humans perceive some properties as intermediates (neither one pole nor the opposite) and that this is common to various sense modalities. When something which is initially very close to you moves further away, for a certain range of distances it is still perceived as near (although at varying degrees). This is followed by a range of distances that are perceived as neither near nor far before the object is perceived as being far away (and progressively further with various gradations of distance). Similarly, a tone of the voice can be perceived as low, high or neither low nor high; a cup of tea as sweet, bitter or neither sweet nor bitter; a street may be downhill, uphill or neither downhill nor uphill (i.e. on a level); a pair of shoes are loose-fitting, tight or neither loose nor tight (and only if they are neither loose nor tight do we buy them). Linguistically, intermediates are in most cases expressed by a double negation (e.g. *neither small nor large; neither full nor empty; neither long nor short...*) or by terms which work as cover-alls for very different dimensions (e.g. *medium* or *normal*, applied to size, brightness, weight, intensity of smell and many more); only rarely are they expressed using specific terms (e.g. *tepid*). But these linguistics aspects are not what we are interested in here. We aim to define the range of qualitative variations leading from an extreme property to its opposite comprising one or a series of properties which are recognized by an adult observer as neither one pole nor the other. And this question has to be addressed in terms of phenomenological psychophysics (Kubovy, 2003; Kubovy & Gepshtein, 2003).

A taxonomy of intermediates with regard to spatial properties had already been put forward in a recent work (Bianchi, Savardi, & Kubovy, 2011). In the present paper we wondered: (a) whether we can provide support for this taxonomy – and evidence that it is perceptually based – using more traditional methods of experimental psychology than those used in the original study; (b) whether we can demonstrate that the recognition of intermediates does not take longer than the recognition of poles – and we consider this to be evidence of the fact that they are immediately perceived and not derived by means of a double exclusion process involving the two polar components – and (c) whether differences emerge when rating tasks versus classification tasks are used.

Before presenting the procedures and results of the studies carried out, two other observations are relevant to set the framework of these studies.

I) *Perceiving the middle, perceiving intermediates*: Even though a phenomenological psychophysical investigation of intermediates is only at the early stages, there are, on the other hand, a considerable number of psychophysical studies where bisection tasks have been used to test people's ability to find the exact middle of a line during visual or haptic exploration (Bowers & Heilman, 1980; Brooks, Della Sala, & Logie, 2011; Fink, Marshall, Weiss, & Zilles, 2001; Gallace, Auvray, & Spence, 2007; Masin, 2008; Millar & Al-Attar, 2000; Post, O'Malley, Yeh, & Bethel, 2006), of chromatic scales (Cavézian, Valadao, Hurwitz, Saoud, & Danckert, 2012; Mattingley, Bradshaw, Nettleton, & Bradshaw, 1994), or of auditory dimensions (Dufour, Touzalin, & Candas, 2007; Ocklenburg,

Hirnstein, Hausmann, & Lewald, 2010; Sosa, Clarke, & McCourt, 2011). What is often emphasized in this literature is that there are systematic biases in what healthy people perceive as being the exact middle which does not perfectly correspond to the physical middle (an extensive meta-analysis is reported in Jewell & McCourt, 2000; McCourt & Olafson, 1997). However, what these studies also prove is that the task is easily feasible – people can perform it even with a single exploration (Lee et al., 2004) – and the ability to bisect does not only apply to a single sense mode but to various sense modes (which is why blind people can also do it – see Cattaneo et al., 2011). In other words, there is extensive and incontrovertible evidence that the perceptual system is tuned to find the middle and any errors generally concern precision. Additional evidence of this automatic ability in animal cognition has also been found (Mannella & Baldassarre, 2007; Tommasi & Thinus-Blanc, 2004; Tommasi & Vallortigara, 2000; Tommasi, Vallortigara, & Zanforlin, 1997). Furthermore, the special status of the center in human perception has been emphasized in literature which is not strictly psychophysical (for instance Arnheim, 1988).

All this literature is relevant to the present paper since it demonstrates the sensitivity of the cognitive system when focusing on what is ‘around the middle’ (etymologically, *inter-medius*). However, while bisection tasks point to a special case of intermediates since what is being sought is the single experience (a point, a tone, a pitch, an intensity) perceived as the exact middle between two endpoints, in the ecological world the perception of intermediacy is not necessarily associated only with a single experience but may extend also to ranges of experiences. For instance, it is likely that when one looks at a climber exactly in the middle between the top and the bottom of a mountain, one perceives him or her to be in an intermediate position. However, there is a wider range of positions that the climber might occupy where we would still perceive him/her as being neither at the bottom nor at the top of the mountain.

II) *Looking for invariance*: Literature on situated cognition (e.g. Clancey, 1997) has emphasized that cognition is affected by context, and some perceptual studies have shown that perception is also affected, to a certain degree, by subjective variables. For example with regard to spatial properties, which are the subject of this paper, slant perception turned out to be in part affected by mood (e.g. Riener, Stefanucci, Proffitt, & Clore, 2011) or object size by apparent grasping abilities (e.g. Linkenauger, Witt, & Proffitt, 2011). It is obvious to us that the perception of being at the midpoint of or at the top of a mountain might change to a certain degree when ascending or descending, or might depend on how tired the climber is. However, subjective conditions are not the focus of this study – whereas context has been partially taken into consideration by applying the same dimensions to two different objects (as explained in the method section of study 1). Our main focus here, as in previous works on the phenomenological psychophysics of opposites (Bianchi, Savardi, & Burro, 2011; Bianchi, Savardi, & Kubovy, 2011) is to test invariance.

## 2. Starting point and research questions

According to the taxonomy identified by Bianchi, Savardi, and Kubovy (2011) – which, to avoid repetition, we will refer to in the following pages as BSK – spatial dimensions are characterized by 4 different phenomenological structures, defined by the topological and metric characteristics of pole A, intermediates, and pole B.

i) Point–No intermediates–Range (PNR): prototype *complete-incomplete*. These dimensions are metrically characterized by strong asymmetry and a negligible intermediate region. Topologically, the shorter pole is in most cases a single experience, what in topology is called a point; in some, rarer, cases it is a restricted bounded range. The longer pole is an unbounded range; the intermediates are non-existent;

<sup>1</sup> Studies on degree modifications in linguistics (e.g. Kennedy & McNally, 2005; Paradis, 2000) are not studies on intermediates in the sense intended in this study (i.e. experiences perceived as *neither a, nor b*). They demonstrate that properties are gradable (e.g. *quite large; almost at the top*). This gradability is in a sense a necessary condition in order to have something in between the two extremes but this ‘something in between’ may be recognized as *gradations of pole a* or *gradations of pole b* and not necessarily as *neither a nor b*, which is instead what we have been specifically investigating here (i.e. a ‘third component’ of dimensions, when it exists).

Download English Version:

<https://daneshyari.com/en/article/919908>

Download Persian Version:

<https://daneshyari.com/article/919908>

[Daneshyari.com](https://daneshyari.com)