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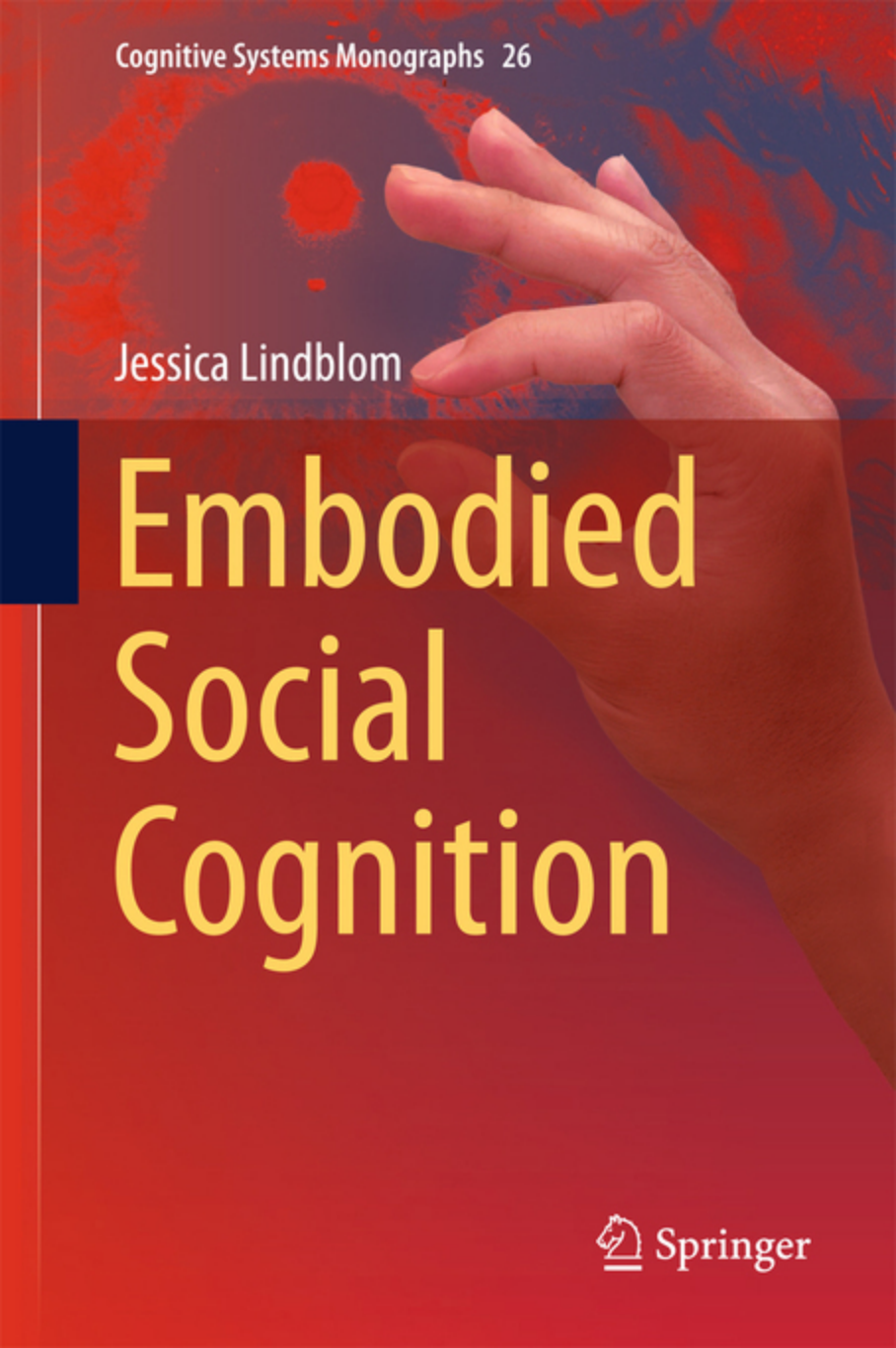

Jessica Lindblom

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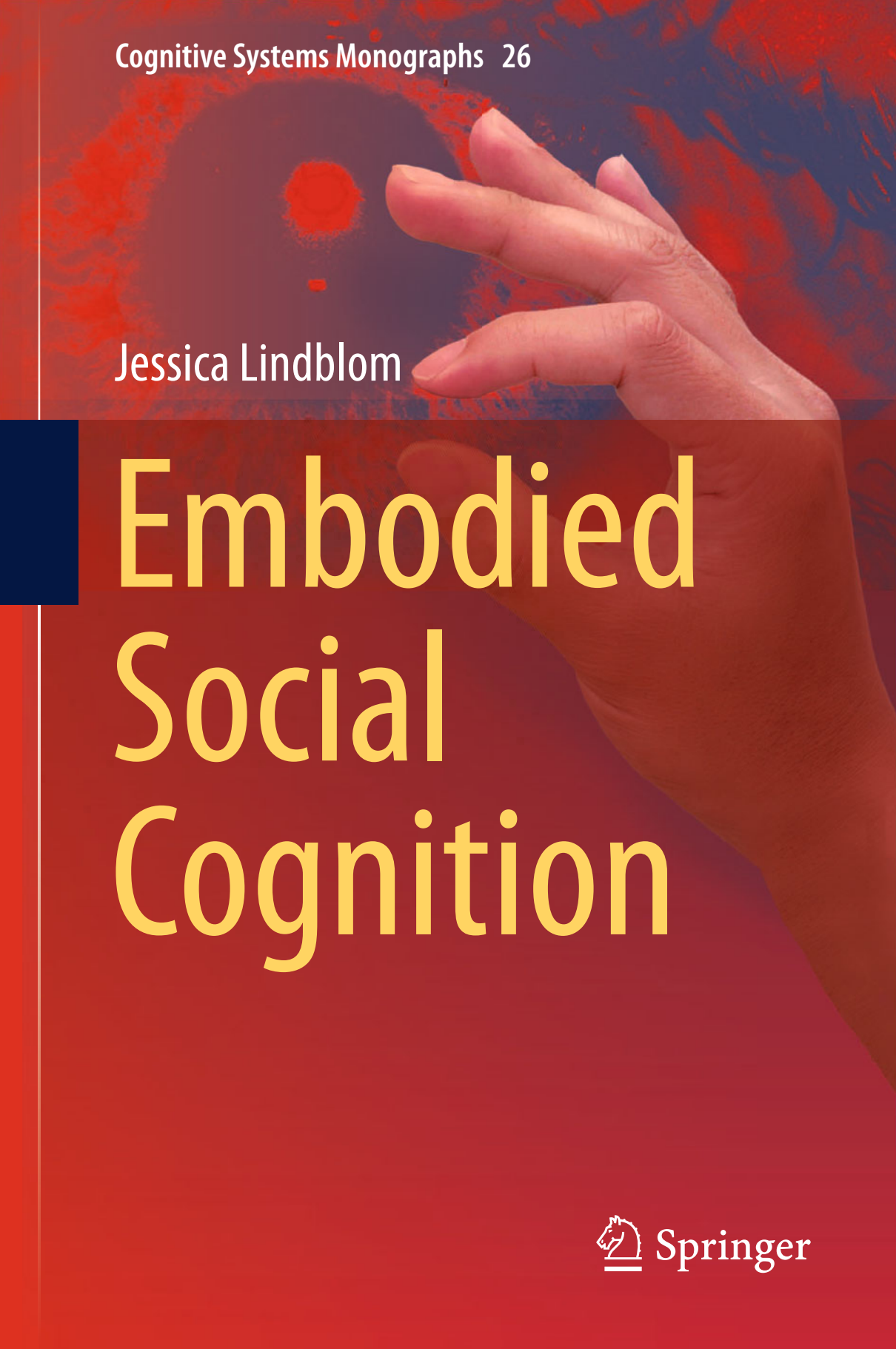

Jessica Lindblom

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Cognitive Systems Monographs

Volume 26

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Preface

This book is based on the work carried out during my Ph.D. thesis project. The research aim was to clarify the role and relevance of embodiment in social interaction and cognition. In doing so, I did not intend to bridge the 'gap' between, e.g., verbal versus nonverbal interaction. Instead, I re-characterized the issue and developed a thorough and integrated understanding that supports and explains the relationships that actually exist, which originate from the relational nature of socially embodied interaction and cognition. I argue that embodiment is a part and parcel of social interaction and cognition in the most general and specific ways, and in which dynamically embodied actions themselves have meaning and agency.

In order to investigate and analyze the role and relevance of embodiment in social interaction and cognition, the chosen approach consisted of three interrelated parts; (i) theoretical work that resulted in a conceptual framework, (ii) empirical work which illustrated parts of the theoretical framework, and (iii) their implications to cognitive science and socially interactive technology. The main part of the research was theoretical work based on an extensive literature analysis, which was used to situate the resulting framework in its historical context and to serve as its foundation. However, there was no single methodology or discipline that alone could provide the full picture of the task to be accomplished in my research, and therefore an interdisciplinary approach, which combined research and insights from a number of different disciplines, was used. The research literature discussed in the book is wide-ranging, flowing not only vertically through time but also horizontally across disciplines. It involves and addresses different research methodologies and disciplines, such as artificial intelligence, phenomenology, ethology, cognitive science, developmental psychology, neuroscience, social psychology, communication, gesture studies, and linguistics. However, it should be noted that I was aware of the potential risks of such a strategy, since I cannot claim to be a specialist in all of these disciplines, their specific terminologies, and theories. Although these different disciplines at first glance may not seemed to have much in common, they offered highly complementary rather than alternative views, which helped me gain deeper as well as broader views of how crucial the body and its physiological

processes are in embodied social cognition. Therefore, the hand that holds the analytic lens throughout the book takes an embodied outlook.

Looking back at the past years, it is quite clear that the effort of working in academia (as both a researcher and a teacher), is a collective, and indeed a social experience. I therefore wish to express my sincere thanks to my colleagues and friends at the University of Skövde, Sweden. First of all, to my excellent supervisor Prof. Tom Ziemke for believing in my capability from the very beginning, and for his support and encouragement over the years. I also wish to thank Tarja Susi, Beatrice Alenljung, Henrik Svensson, Jana Rambusch, Peter Thorvald, David Vernon, Erik Billing, Rebecca Andreasson, Björn Lundell, and Maria Nilsson. Some of you for sharing my time as a doctoral student, and others for being my current colleagues.

Thanks to all people who allowed me to use the video-recording from our visit in Montana as data for the empirical study.

I also want to thank my friends and family outside the academic world. Here I particularly include those who spent some time with me when I needed to get away from the writing, including four-legged friends. The time spent with my horses has been a solace for the soul. Last but not least, I dedicate this book to my grandparents.

Lerdala Jessica Lindblom
April 2015

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Chapter 1
Introduction

> *First of all, there is the belief that, in talking about human cognitive activities, it is necessary to speak about mental representations and to posit a level of analysis wholly separate from the biological or neurological, on the one hand, and the sociological or cultural, on the other.*
>
> Gardner, 1987

> *By using the term embodied we mean to highlight two points: first, that cognition depends upon the kinds of experiences that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities themselves are embedded in a more surrounding biological, psychological and cultural context.*
>
> Varela, Thomson and Rosch, 1991

What is the role and relevance of the body in social interaction and cognition? There is no single, simple answer to this question. As the introductory quotes reveal, in cognitive science there are completely different views of how to consider the issue. Is it the case that the body has no role at all, other than a mere implementation of a computational process as stated above by Gardner [1] or does it play a crucial role in the shaping of the mind as the quote by Varela et al. [2] suggests? The traditional view of social interaction in cognitive science has been that agents relate to each other in much the same way as they relate to other parts of the external world, that is by having more or less explicit internal representations of each other, which then are manipulated internally (cf. e.g. [3–5]). The most common, as well as still dominant, view of the role of the body in social interaction and cognition, in cognitive science, is as a trivial 'appendage' to the real intellectual language and mind. Therefore, bodily aspects are frequently addressed in terms of *nonverbal communication*, *nonverbal behavior*, or *body language*. However, it has been estimated that almost two thirds of the meaning in a social situation are conceived from these 'nonverbal signs' (cf. e.g. [6]), whereas speech has been estimated to account for merely some few percent (cf. e.g. [7]).

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Nevertheless, how to describe and define the significance of the body in social interaction and cognition depends on one's theoretical orientation. According to my own point of view, which resembles that of Varela et al., this issue can be considered from an ***embodied cognitive science*** perspective. During the past three decades, theories of *embodied*, *situated* and *distributed* cognition have offered a radical shift in explaining the human mind. One might say a Copernican revolution within the cognitive sciences—from the traditional cognitivist perspective, (cf. Gardner's quote above) which considers cognition in terms of internal symbolic representations and computational processes—to emphasizing the way cognition is shaped by the body and its sensorimotor interaction with the surrounding world (cf. e.g. [2, 8–18]). This is a reaction against the cognitivists' *computer metaphor of mind*, which is a centralized view of cognition taking place inside the skull with the body only serving as some kind of input and output device, i.e. a physical interface between an internal program (cognitive processes) and an external world. Thus, *embodiment* has become a much discussed concept [19–22] which many regard, together with *situatedness*, to be the defining feature of a new approach to the study of cognition. Usually referred to as 'embodied cognitive science' it portrays a much more complex picture of the mind.

By taking a situated, distributed and embodied perspective, it has been suggested that the external environment can be used as a kind of extension of our mind, since these external structures function to complement our individual 'skin and skull'. For example, Clark [8] states "[w]e are masters at structuring our physical and social worlds so as to press complex coherent behaviors from these unruly resources. We use intelligence to structure our environment so that we can succeed with less intelligence" (p. 180). This is in stark contrast to mainstream cognitive science, which has viewed context, history and culture as "murky concepts", as Gardner ([1], p. 41) stressed, that would only cause problems in the effort to find the 'essence' of individual cognition. Instead, it was argued, these aspects could be addressed and integrated when cognitive science had achieved an understanding of the central inner mechanisms of individual cognition [1]. Hutchins [15], however, pointed out that there are unnoticed costs involved when we disregard culture, context and history, which he considers important factors in the development of individual intelligence. In addition, Tomasello [23] for instance, hypothesized that if a human child grew up from birth without any cultural contacts, and no exposure to human artifacts the child would not develop the cognitive skills that are considered the hallmarks of human intelligence.

In order to exemplify the close interrelatedness between the so-called 'biological' and 'cultural' aspects, one can use Ingold's [24] example of learning to walk as an illustration. It is commonly argued that walking is an innate human capability, but Ingold does not categorize human walking as either biological or cultural. A child learns to walk according to the standard manner of its social and cultural environment, which is reinforced by biological aspects. Some cultures encourage children to start walking at a very early age, as in Western societies, and therefore different physical scaffolds are used to encourage their motoric development. Other cultures actively delay their children's initial walking attempts, and actually hinder their motoric development. Furthermore, different ways of walking are culture-dependent

(e.g. [25]). Therefore, there is no one 'natural' or 'pure' biological way of walking, as one might assume. This means, the human skill of walking can be viewed as not only 'biological' in the sense of being a part of the functions of the individual human's biology, but also a result of the child's involvement in a social and physical world during normal development.

An illustrative example is found in Maturana and Varela [26]. They describe the case of two Hindu girls in India, who were taken from a wolf pack with which they have lived in without human contact. (The girls were five respectively eight years old at that time). When the girls were 'rescued' from the family of wolves, they moved on all fours, not knowing how to walk on two legs. The girl that survived the breaking-up from the wolf pack subsequently learned to walk on two legs as 'ordinary' humans, through human support. Consequently, instead of continuing the struggle between biology and culture, one should consider their interrelatedness from a socially embodied perspective, since "the former can only ground the latter and thus can never explain it" (Varela [27], p. 171). As pointed out by Rogoff [25], "the either/or questions are as pointless as asking whether people rely more on their right leg or their left leg for walking" (p. 65). While this means that our physical embodiment constrains (e.g. how we can move our hands), cultural norms affect (e.g. how to gesture in a certain cultural setting), but do not determine, the structure of socially embodied interactions.

The use of strategies such as taking advantage of external structures to co-ordinate action and cognitive behavior might be considered another and complementary way of explaining intelligent behavior, instead of merely a focus on mental representations of explicit knowledge. These external structures function as a kind of supportive framework or *scaffolding*, i.e. external resources to support and simplify cognitive activity for an individual agent (cf. e.g. [8, 28, 29]). In a broad sense, the human body plus these external factors result in the 'mind', the boundary of which extends further into the world than cognitive science initially assumed. Accordingly, it has been argued that cognition is not an activity of the mind alone, since the mind is 'leaking' out to the environment, to use Clark's [8] vocabulary. Instead, cognition is distributed across the agent, the actual situation and its resources. This has led to the claim that the environment is a part of the cognitive system (cf. e.g. [8, 9, 15, 21, 30–33]). It is therefore very difficult to determine what the actual 'border' is between our senses and the world, since it is impossible to draw a sharp line between what goes on 'inside' the mind and what takes place in the world. To summarize, culture and language are considered our most significant scaffolds [8].

If we leave aside for a moment the main characteristics of situated, embodied and distributed approaches of cognition and focus on *embodiment*, we notice that historically, there are several reasons for the widespread neglect of the *body* in mainstream cognitive and social sciences. On the one hand, it is a consequence of the Platonic-Cartesian heritage, which has resulted in the view of the mind as the internal locus of rationality, thought, language and knowledge (for criticisms of that view, cf. e.g. [16, 34–41]), which is supported by the Christian disregard of the flesh as the

locus of sinful desire and irrationality (but see also Barbour[1]). Moreover, the opposite dimensions have been mapped on each other, resulting in the dualisms of, for instance, mind/body, mental/behavior, reason/emotion, and subjective/objective. On the other hand, researchers commonly overlook the role of the body because they are afraid of slipping into biological reductionism, and therefore they generally tend, or prefer to view mind as superior to and independent of the body (see e.g. [43–45]). In short, the dichotomy between mind and body has in turn produced a disjunction between verbal and so-called nonverbal aspects of interaction. While dictionary definitions of the concept 'nonverbal' usually refer to the absence of words, this has, as pointed out by Farnell [38], unfortunately been interpreted synonymously with the absence of mind, which according to Varela [27] is a 'theoretical failure of nerve'. Therefore, as Agar [46] phrases it, "[w]e need to find a cure for the Cartesian sickness". The traditional dichotomy of mind versus body is challenged by embodied cognitive science. Furthermore, Ingold [24] emphasizes that body and mind are not two separate things, but rather two ways of describing the same process, i.e. the activity of the human agent in its physical and social environment. Similarly, Gallagher [47] points out that an embodied approach attempts to redraw the map, "to develop a vocabulary, which is to say, a discursive or explanatory framework, that helps us to understand how the body shapes the mind" (pp. 243–244). It should be pointed out, however, that there are different opinions within embodied cognitive science concerning to what extent cognition is considered to be embodied. Clark [10], for instance, distinguishes between *simple embodiment* and *radical embodiment*. In simple embodiment, the traditional foundation of cognitive science (i.e., information-processing and computationalism) is preserved, and the nature of embodiment is merely considered a constraint of the 'inner' organization and processing. Radical embodiment, on the other hand, goes much further and treats the facts of embodiment as a fundamental shift in the explanation of cognition that is "*profoundly altering the subject matter and theoretical framework of cognitive science*" ([10], p. 348). In should be emphasized, that in this book, the 'radical' view using Clark's vocabulary [10], is the chosen approach.

1.1 Motivations and Aim

While the body's role in cognitive processes has received much attention in recent discussions under the banners of *embodiment*, *embodied cognition* and *embodied cognitive science*, and a large variety of notions and levels of embodiment and embodied cognition have been developed, there is no common understanding of what actually constitutes embodied cognition, and subsequently what kind of 'body' it might require (cf. e.g. [2, 8, 10, 11, 14, 17, 19–22, 47–57]). Much research, so far, has considered the interaction between the *individual* agent and its environment,

[1] Barbour [42] points out that the dichotomous concept of man in Christianity is a result of the Greek dualism of body and soul and actually not supported by the biblical view.