ORIGINAL ARTICLE

Two traditions of cognitive sociology: An analysis and assessment of their cognitive and methodological assumptions

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Abstract

Cognitive sociology has been split into cultural and interdisciplinary traditions that position themselves differently in relation to the cognitive sciences and make incompatible assumptions about cognition. This article provides an analysis and assessment of the cognitive and methodological assumptions of these two traditions from the perspective of the mechanistic theory of explanation. We argue that while the cultural tradition of cognitive sociology has provided important descriptions about how human cognition varies across cultural groups and historical periods, it has not opened up the black box of cognitive mechanisms that produce and sustain this variation. This means that its explanations for the described phenomena have remained weak. By contrast, the interdisciplinary tradition of cognitive sociology has sought to integrate cognitive scientific concepts and methods into explanatory research on how culture influences action and how culture is stored in memory. Although we grant that interdisciplinary cognitive sociologists have brought many fresh ideas, concepts and methods to cultural sociology from the cognitive sciences, they have not always clarified their assumptions about cognition and their models have

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sketched only a few specific cognitive mechanisms through which culture influences action, meaning that they have not yet provided a comprehensive explanatory understanding of the interactions between culture, cognition and action.

1 | INTRODUCTION

Cognitive sociology is a relatively recent phenomenon in sociology, since systematic research at the intersection of culture and cognition began in the late 1990s. Since then this research field has been split into two research programs: the cultural tradition of cognitive sociology (hereafter: CT) and the interdisciplinary tradition of cognitive sociology (hereafter: IT). CT has built upon and extended Zerubavel's (e.g. 1991, 1997, 2019) pioneering work that has sought to develop a sociological approach to mental phenomena (Brekhus, 2007). Instead of seeking to integrate cultural sociology with the cognitive sciences, CT has aimed to complement cognitive sciences with sociological studies on the socially variable patterns of cultural cognition, while assuming that cognitive scientists focus exclusively on the universal foundations of human cognition (e.g. Brekhus, 2007, 2015; Zerubavel, 1997, 2019). By contrast, IT has been influenced by DiMaggio's (1997) influential review article in which he argues that the cognitive sciences (broadly understood) provide conceptual tools and empirical findings for clarifying and resolving theoretical and meta-theoretical debates in cultural sociology. IT has embraced DiMaggio's early interdisciplinary vision, according to which "cognitive sociology involves studying the mechanisms by which cultural processes enter into individual minds and shape the microfoundations of social action" (Brekhus & Ignatow, 2019, p. 2).

We assume that the twofold distinction between CT and IT is suitable for the main objective of this article, which is to analyze and assess the cognitive and methodological assumptions of cognitive sociologists from the perspective of the mechanistic theory of explanation.[1] We recognize that, for example, Brekhus (2015, pp. 9–18) has proposed more fine-graded distinctions between "contemporary traditions in the sociology of culture and cognition". However, his categories include research programs, such as symbolic interactionism, whose advocates are not typically interested in the relations between sociology and the cognitive sciences. It is also possible to distinguish other varieties of cognitive sociology, or cognitive social theory, in the context of European sociology (see Strydom, 2007). In this article, we focus on cognitive sociology in the US.

We will use the mechanistic theory of explanation to evaluate theoretical assumptions and explanations developed in two traditions of cognitive sociology. This theory is relevant for the assessment of CT and IT because it provides a systematic framework for analyzing interdisciplinary relations and evaluating cognitive explanations for social and cultural phenomena (e.g. Sarkia et al., 2020). It enables us to identify problematic theoretical assumptions and areas of research where more work is required in both traditions of cognitive sociology. In addition, the idea of mechanistic explanation is already present in many empirical studies by the advocates of

IT and we suggest below that CT would benefit if it would focus more on cognitive mechanisms pertaining to those phenomena that are studied by its advocates.

Although we are interested in assumptions that cognitive sociologists make about human cognition, we do not begin our article by defining the concept of cognition for two reasons. First, as we shall see, one of the controversies between CT and IT concerns their understanding of human cognition. Second, there is no generally accepted definition for the concept of cognition in the cognitive sciences either, given the ongoing controversies between the representationalist and the anti-representationalist accounts of cognition as well as between the intra-cranial and the distributed or extended approaches to cognitive processes (e.g. Bechtel, 2008; Clark, 1997; Hutchins, 1995; Turner, 2018). For these reasons, our argumentation strategy is to analyze the cognitive assumptions in CT and IT and to assess them from the viewpoint of the mechanistic theory of explanation and some recent developments in the cognitive sciences. Hence, our aim is not to provide a comprehensive account of the recent developments in the cognitive sciences nor to defend any specific definition of cognition.

The structure of our article is as follows. We will begin by formulating our analytical framework. It includes accounts of the concepts of social and cultural cognition and a brief description of the basic ideas and concepts of the mechanistic theory of explanation. Then we will discuss and assess the cognitive assumptions of CT and IT respectively by focusing on three questions: (i) What are the cognitive mechanisms through which culture influences action? (ii) What constitutes cultural cognition and how it relates to social cognition? (iii) What form "internalized culture" takes in the cognitive processing of individuals? We do not aim to provide a comprehensive review of the empirical work done in these traditions (for more comprehensive reviews, see Brekhus, 2015; Cerulo et al., 2021). Instead, we use the previous questions and our analytical framework to identify some constitutive theoretical and methodological assumptions of these traditions, with the aim of evaluating and comparing them. We will close the paper by summarizing our main points and suggesting new research topics for cognitive sociology.

2 | ANALYTICAL FRAMEWORK

2.1 | Social cognition and cultural cognition

In order to analyze phenomena studied in two traditions of cognitive sociology, we make a distinction between the concepts of social and cultural cognition. By the concept of social cognition, we refer to information processing[2] about other people, social situations and social relations that enables us to understand and interact with each other. Social cognition in this broad sense may take place in social interactions in which we actively engage in either face-to-face or in a technologically mediated manner, or in isolation from immediate social interactions. One of the most important capacities pertaining to both types of social cognition is our ability to understand other people as intentional agents with mental states, such as beliefs, desires and emotions, of their own. While it is generally accepted that humans have this kind of capacity for "mindreading" or "mentalizing", there has recently been much debate about its exact nature and underlying mechanisms (e.g. Turner, 2018, chap. 3; Veissière et al., 2020).

We use the concept of cultural cognition to refer to those types and aspects of human cognition that vary between groups and historical periods since this has been the primary way in which this concept has been understood in cognitive sociology (e.g. Brekhus, 2015). In other words, cognitive sociologists are interested in cognitive elements that are (at least to some extent)

shared by the members of one or more groups and that are different from the same kind of cognitive elements of other groups. In different approaches in cognitive sociology, cultural cognition has been assumed to include one or more of the following elements:

1. the contents of perceptions, memories, beliefs, classifications or mental representations (e.g. schemas, scripts, mental models or conceptual metaphors) that vary between cultural groups;
2. socially learned cognitive skills (e.g. skills for reading, writing and arithmetic), dispositions and habits;
3. heuristics, judgements and decision-making processes that depend on cultural commitments;
4. the cognitive affordances of artifacts (e.g. material signs, maps and texts) and culturally constructed material environments (e.g. assembly lines, supermarkets and classrooms)
5. conventions, norms and traditions that shape cognitive processes
6. the cognitive aspects of norms, institutions and rituals that vary between cultural groups.

The controversies surrounding the concept of cultural cognition concern the extent of which human cognition varies culturally, the relation between the concepts of cultural and social cognition, the extent of which people who belong to the same group share cognitive elements, and the location of cultural cognition. Hence, not all cognitive sociologists accept or analyze these all six types of cultural cognition and their controversies also relate to differences in the ways in which they understand the concept of culture (e.g. Lizardo, 2017).

2.2 | Mechanistic theory of explanation

According to the mechanistic theory of explanation, the primary way in which cognitive and social scientists explain phenomena is by developing models (broadly understood) of mechanisms that are responsible for the phenomenon of their interest — often in combination with enabling conditions and causally relevant contextual factors (e.g. Bechtel, 2008; Glennan, 2017; Hedström & Ylikoski, 2010; Sarkia et al., 2020). In this article, we employ Glennan's (2017, p. 17; see also Illari & Williamson, 2012, p. 120) minimal account of mechanisms, according to which a mechanism for a phenomenon "consists of entities (or parts) whose activities and interactions are organized so as to be responsible for the phenomenon." The minimal account is not only compatible with the idea that mechanisms form hierarchies in the sense that lower-level mechanisms operate as parts of higher level mechanisms. It also applies to the most prominent definitions of cognitive (or mental) mechanisms (e.g. Bechtel, 2008) and social mechanisms (e.g. Hedström & Ylikoski, 2010) that are more detailed.

Scientists' main objective for developing mechanistic models is to represent mechanisms that underlie, maintain or produce the phenomena that they have empirically established in their research. When they use mechanistic models for explanatory purposes, scientists ultimately aim to answer how phenomena are generated in terms of their component entities and their organized activities and interactions (e.g. Bechtel, 2008; Craver & Darden, 2013; Glennan, 2017). This implies that mechanistic models used for explanatory purposes are not abstract and universal law statements or mere instruments for generating predictions about observable phenomena. Although scientists typically aim to make their mechanistic models more comprehensive over time, in particular experimental and quasi-experimental studies they may focus on explaining specific aspects of phenomena by posing contrastive explanatory questions that may include counterfactuals. In order to answer these questions, they often abstract away from those mechanism

parts that are causally irrelevant to the specific aspect of the phenomenon under study or make idealized assumptions about them. Hence, answering the contrastive questions of this kind does not require them to use a comprehensive mechanistic model although their explanatory studies presuppose the existence of the mechanism of interest. In any case, mechanistic models used for explanatory purposes are inherently multilevel, reflecting more or less abstractly and accurately the intersecting hierarchies of mechanisms in the world (e.g. Bechtel, 2008; Glennan, 2017). This means that mechanistic models by definition include at least a representation of the phenomenon to be explained and a (more or less comprehensive) representation of the mechanism that is responsible for the phenomenon. Mechanistic models in different research fields take many different forms, such as qualitative propositions, diagrams, equations or computational simulations.

We analyze and evaluate the cognitive and methodological assumptions of the cultural and interdisciplinary traditions in cognitive sociology by applying Craver and Darden's (2013, pp. 31–34) distinction between three types of mechanistic models in terms of their degree of comprehensiveness. The least demanding are *black box sketches of mechanisms* that can be understood as placeholders for proper mechanistic models that have not yet been developed. As such, they may either mislead empirical research or guide it to fruitful directions, depending on whether the black box sketches help scientists in developing more demanding mechanistic models. The second type of mechanistic models consist of *gray box sketches of mechanisms* that identify some of their constitutive entities, activities and interactions but leave many gaps to be filled in by the subsequent research. One of their functions is to help scientists to develop new research designs and methods that would help to fill in the gaps of these models. Finally, *glass box schemas of mechanisms* are the most comprehensive mechanistic models that describe all entities, activities and interactions that are relevant for addressing the explanatory question how the phenomenon of interest is generated. They open up the black box underlying the phenomenon by showing the inner constitution and functioning of the mechanism responsible for the phenomenon in a specific environment. However, scientists' explanatory interests and pragmatic contexts are relevant for the evaluation of particular explanations since there are no perfect models that would serve equally well to all explanatory tasks (e.g. Sarkia et al., 2020). In many research contexts, there are also trade-offs between the generality and comprehensiveness of specific mechanistic models that should be taken into account when these models are evaluated (e.g. Glennan, 2017, pp. 62–64). However, when we assess the two traditions of cognitive sociology, we assume that two indicators for the explanatory success of a research tradition are that its mechanistic models about specific phenomena become more accurate and comprehensive over time.

3 | COGNITIVE AND METHODOLOGICAL ASSUMPTIONS IN COGNITIVE SOCIOLOGY

With these conceptual distinctions in mind, we will now move on to analyze and evaluate the cognitive and methodological assumptions of the cultural tradition in cognitive sociology (CT) and the interdisciplinary tradition in cognitive sociology (IT). We will mostly focus on their answers to the three interrelated questions: (i) What are the cognitive mechanisms through which culture influences action? (ii) What constitutes cultural cognition and how it relates to social cognition? (iii) What form "internalized culture" takes in the cognitive processing of individuals?

3.1 | The cultural tradition of cognitive sociology

The cognitive and methodological assumptions in CT stem from how its representatives see the division of labor between cognitive science and cognitive sociology. Following Zerubavel (1997, 2019), cultural cognitive sociologists consider their work as conceptually and methodologically distinct, but complementary to cognitive science. Accordingly, they assume that cognitive science studies exclusively the universal foundations of human cognition by using experimental and computational methods. Hence, advocates of CT do not usually openly challenge the cognitive sciences, since they consider their research questions and methods different from those of cognitive scientists. Instead, they aim to complement cognitive scientific explanations by describing how the contents of mental representations or meanings vary across groups, cultures and historical periods, how they are shaped by social and moral norms, and how they guide the cognitive processes of the groups of individuals in their real-life contexts (e.g. Brekhus, 2007; Zerubavel, 1997, pp. 21–22).

For a recent example, DeGloma (2015) analyzed mnemonic battles related to child sex abuse, the Vietnam war and American slavery. His study identified a general pattern in these three cases in which mnemonic battles emerged when subversive agents began to "combat default (and relatively unseen) cultural and sociomental norms, whether those norms principally involved mechanisms of denial, moral coding or mnemonic closure" (DeGloma, 2015, p. 182). DeGloma's (2015, p. 183) conclusions highlighted the way in which cultural cognitive sociologists position themselves in relation to cognitive processes: "it is the underlying cultural forms – the patterns of memory and mnemonic battle – that determine how we relate to the past and how actors connect autobiographical memories to collective memory and, thereby, the self to community". In addition, Friedman (2013, p. 20) employed "a cognitive sociological approach, emphasizing the link between perception and cognition and highlighting the sociocultural organization of both" in a study on the social construction of sex. Applying Zerubavellian pattern analysis to her interview data, she argued that female and male bodies are socially constructed by perceptual processes that involve filtering and conventional classifications that are shared by groups of people. Interestingly, this kind of understanding of cultural cognition is also present in the recent research of Dan Kahan and his colleagues in the fields of risk perception and the psychology of law. Although not directly building on the sociological work of Zerubavel, Kahan has founded his theory of "cultural cognition" on a similar sounding view of the primacy of the cultural commitments to factual beliefs. According to this theory, different individuals interpret factual evidence in ways that reinforce their connections to those with whom they share a worldview (Kahan & Braman, 2006), which in turn affects their beliefs about the consequences of highly charged policies, such as those concerning gun control and environmental issues.

However, the cognitive assumptions of CT can be best analyzed by focusing on Zerubavel's (1997) account of how culture or society influences the ways in which people think as members of distinct thought communities. In the introduction to his influential textbook, *Social Mindscapes: An Introduction to Cognitive Sociology*, Zerubavel (1997, p. 15) writes that:

> It is the process of *cognitive socialization* that allows us to enter the social, intersubjective world. Becoming social implies learning not only how to act but also how to think in a social manner. As we become socialized and learn to see the world through the mental lenses of particular thought communities, we come to assign to objects the same meaning that they have for others around us, to both ignore and remember the same things that they do, and to laugh at the same things they find funny.

Learning to classify the world is perhaps the most important process in cognitive socialization according to CT. Zerubavel (1991, 1997) suggests that this process profoundly affects how we perceive the world and what we think and remember about it (see also Brekhus, 2007, p. 454). According to Zerubavel's (1997, pp. 66–67) account, "[b]reaking up the world into discrete, quasi-insular mental chunks is accomplished largely through language" and the internalized categories of this "highly impersonal" language are conventional rather than natural.[3] Hence, he contends that we should "avoid the tendency to reify the conventional islands of meaning in which we organize the world in our minds and to remember that the gaps we envision separating them from one another are purely mental" (Zerubavel, 1997, p. 67; see also pp. 41–42). This means that internalized "[m]ental divisions as well as the entities they help to delineate have no ontological status whatsoever" (p. 67). Hence, the socially variable patterns of cultural cognition are constituted by those "conventional islands of meaning" that people internalize via their "primary cognitive socialization" in childhood and during their "secondary cognitive socialization" when they enter new "thought communities" or "cognitive subcultures" later in their lives (p. 19). Although some of Zerubavel's statements sound radical (e.g. a claim that internalized conventional categories shape how we perceive the world and a claim that entities mentally classified by using language have no ontological status), it is not entirely clear to what extent he regards the nature of reality and mind as socially or linguistically constructed, which is a typical feature in many works by social constructionists (Elder-Vass, 2012; Hacking, 1999).

Building upon the assumption that cultural cognition is a socially and linguistically constructed phenomenon that includes culturally variable perceptions, memories and thought processes, CT aims to identify and describe the socially variable patterns of cultural cognition by means of case studies and comparative research that mainly utilize qualitative methods (Brekhus, 2007). Many cultural cognitive sociologists have also aimed to identify and unmask such conventional and contingent patterns of cultural cognition that are repressive but mistakenly treated as natural (or universal or normal) features of reality and, thereby, contributed to attempts to transform them into less repressive forms (Brekhus, 2015; Friedman, 2013; Zerubavel, 1997). For example, advocates of CT have focused on "the socio-mental process of lumping and splitting that allows us to experience a racialized world wherein 'islands of races' are socially carved and continually reified as such in relation to other 'islands of meaning'" (Brekhus et al., 2010, p. 64). In this way, CT emphasizes the contingent and socially constructed nature of "races" that can be overcome by means of transforming the racializing classifications of people and the racist practices that are based on them. In addition, advocates of CT underline that modern societies are cognitively pluralist, by which they mean that people belong to many intersecting thought communities and, therefore, "think somewhat differently in different social contexts" (Zerubavel, 1997, p. 17). Examples of these thought communities include "churches, professions, political movements, generations, [and] nations" (Zerubavel, 1997, p. 9).

3.2 | Evaluation of the cultural tradition

In our assessment, cultural cognitive sociologists have produced important descriptions of the culturally variable and historically contingent meanings that people rely on in their understanding of many social and historical phenomena. They have also posed important questions concerning how social and cultural norms guide thinking, actions and interactions of people in different cultural contexts. However, since CT has focused on "the ubiquitous role of language in our lives" (Zerubavel, 1997, p. 7) and "the sociomental conventions" that constitute the social

patterns of cultural cognition, it has not adequately opened up the black box of the cognitive and neural mechanisms that underlie cognitive socialization and cultural cognition. This omission has limited the ways in which the advocates of CT have understood and explained particular cultural phenomena. For example, racist practices cannot be comprehensively explained by arguing that "races" are socially constructed by the linguistic classifications of racist thought communities that guide their members' thinking, actions and interactions. This is because social psychological studies have shown that racist attitudes may also be based on implicit cognitive biases that are not coded in linguistic format to our memories (e.g. Amodio & Devine, 2006). Hence, CT cannot provide a satisfactory answer to all those research questions that it poses without extending its methodological repertoire to include methods developed in the cognitive sciences, such as implicit association tests and other experimental methods. In addition, CT has not adequately discussed empirical research in the cognitive sciences that is relevant to its claims regarding the extent of which language and culture influences perceptions, memories and thinking. In order to do this, Zerubavel's (1997) and others highly abstract claims should be transformed into hypotheses that can be tested empirically.

The limitations and problems in CT's accounts of cognitive processes have also been addressed in Ignatow's (2007) and Lizardo's (2012, 2015) critiques of the cognitive assumptions of CT — or, more generally, what Lizardo (2015, p. 567) calls "the classical theory of culture and cognition". Ignatow's (2007, pp. 120–124) arguments against CT draw on cognitive psychologist Barsalou's (1999) critique of the traditional amodal approaches to cognition in the cognitive sciences. Ignatow's critique employs Barsalou's (1999) notion of transduction, which refers to a process in which the human mind is assumed to disconnect mental representations from those multimodal perceptual processes (i.e. processes that involve information acquired via different sense modalities, such as vision, hearing and touch) that give rise to these representations. Thereby, the idea of transduction implies that the mind forms "amodal symbols" that can be stored in long-term memory and processed independently of sensory experiences of embodied human beings (see Barsalou, 1999, pp. 578–580). Ignatow (2007, p. 120) interestingly notes that the contents of mental representations of this kind are not only amodal but also arbitrary in Ferdinand de Saussure's sense, meaning that these "representations typically have arbitrary relations to entities in the world." Although Ignatow (2007, p. 120) does not mention Zerubavel's work in this context, it is clear that CT forms a paradigmatic example of "cultural and cognitive sociology" that assumes the idea of transduction. Ignatow's (2007) article reviews cognitive scientific critiques regarding transduction, according to which there is no empirical evidence for the existence of transduction nor a compelling account of the neural mechanisms that would link amodal representations with perceptions and actions of embodied individuals (see also Bechtel, 2008, chap. 5).

Lizardo's (2012, 2015, see also 2017) critique further develops some of Ignatow's (2007) and Turner's (1994, 2002) ideas. It is founded on the assumption that culture exists in two forms depending on whether it is externalized or internalized by individuals. External (or public) culture exists in the form of cultural products that are located outside the bodies of individuals. Internal (or personal) culture exists in the form of representations that are located within the minds of embodied individuals. Lizardo (2015, pp. 578–580) suggests that CT, following the classical theory of culture and cognition, assumes that both external and internal culture take the same form, which he describes by using the terms "cultural symbol" and "cultural meaning". Hence, CT's account of cognitive socialization presupposes that people internalize the contents of external cultural symbols and meanings that they are then assumed to share with other people in their cultural groups — or their "thought communities" to use Zerubavel's (1997) terms. Lizardo (2015, p. 578) argues that this account is based on "the metaphorical imagery of the (format-preserving)

'transfer' of objectified cultural contents (e.g., values, beliefs, propositions) from the external environment into the 'internal' environment of the person." In practice, this transfer is (often implicitly) assumed to happen through a naive learning process which involves "the re-creation of a copy of public culture within the cognitive environment of the actor" (Lizardo, 2015, p. 578) whose final product is "the storage of some (systematic?) set of lingua form representations of external culture" (Lizardo, 2015, p. 578; also; Lizardo, 2017, p. 97). The problem with this view, according to Lizardo (2015), is that no plausible cognitive or neural mechanisms have been ever specified that would support this view and that it is entirely implausible from the viewpoint of embodied cognition (see also Ignatow, 2021; Martin, 2010; Turner, 1994, p. 1254).

In conclusion, CT's answers to the questions that we posed at the beginning of this section are the following:

1. Culture influences cognition through the processes of primary and secondary cognitive socialization and through the ways in which internalized culture shapes the actions and cognitive processes of people in their everyday-lives, but CT has not provided an account of the cognitive mechanisms operating in these processes.
2. Cultural cognition consists of the shared symbolic meanings of thought communities that are conventional and vary across groups, but its relation to social cognition is not specified.
3. Individuals internalize shared meanings of their thought communities, which are assumed to exist in the same amodal and arbitrary linguistic format whether they are internal or external to individuals.

The above discussions show that CT's account of cultural cognition and cognitive socialization is not only limited but also problematic when evaluated in the light of the mechanistic theory of explanation and embodied approaches to cognition. Its problems reflect cultural cognitive sociologists' assumption that their research can proceed without paying detailed attention to cognitive scientific research. This attitude has become increasingly difficult to sustain in recent decades when many cognitive scientists have begun to study not only the universal foundations of social cognition of individuals but also how social interactions and cultural processes shape cognitive phenomena (e.g. Hutchins, 1995; Kaidesoja et al., 2019; Karmiloff-Smith, 1996; Tomasello, 2019). However, we think that Zerubavel (1997) was right when he emphasized the importance of the phenomenon of "cognitive socialization" for cognitive sociology since cognitive sociologists need to provide an account of how groups of people end up sharing cultural cognition.

3.3 | The interdisciplinary tradition of cognitive sociology

The differentiating feature of IT is that it aims to build a bridge between cultural sociology and the cognitive sciences. Its basic assumption is that the cognitive sciences could help cognitive sociologists open up the black box of cognitive mechanisms underlying cultural phenomena in a way that would advance sociological research on the relations between culture, cognition and action. Early debates in IT were motivated by Ann Swidler's (1986) influential article in which she questioned, among other things, the Parsonian account of culture that assumes that people internalize coherent systems of values via socialization and that these internalized values then influence how they make choices between alternative ends. Swidler argued instead that culture forms a fragmented and incoherent tool kit that consists of "symbols, stories, rituals, and world-views, which people may use in varying configurations to solve different kinds of problem" (p. 273)

and to construct strategies of action in a context-sensitive manner. In his review article, DiMaggio (1997) defended Swidler's tool kit theory against Parsonian "latent variable model of culture" by addressing cognitive psychological and cognitive anthropological research on schemas that, he argued, provide a plausible cognitive mechanism through which people acquire, remember and process different tools of their cultural tool kit in particular contexts. He defined schemas as "knowledge structures that represent objects or events and provide default assumptions about their characteristics, relationships, and entailments under conditions of incomplete information" (p. 269) and argued that behavioral stability over time can be accounted in terms of "the cues embedded in the physical and social environment" (p. 267) of acting individuals that active or deactivate specific schemas. DiMaggio (1997, pp. 269–272) also discussed the cognitive scientific distinction between automatic (or implicit) and deliberative (or explicit) cognitive processes in a way that foreshadowed later dual-process models developed by cognitive sociologists.

However, it was not until the publication of Vaisey's (2009) article that the concepts schema and dual-process model were incorporated into IT's empirical research on how culture influences action. His article was partly motivated by Swidler's (1986) and DiMaggio's (1997) formulations and defenses of the tool kit theory of culture since Vaisey (2009) argued that they both failed to provide an account of culture that would explain how culture motivates actions and how people use culture to justify or rationalize their actions afterwards. In order to develop a comprehensive model of culture in action, Vaisey (2009, pp. 1682–1687) combined social psychologists Jonathan Haidt's (e.g. 2001) dual process model of moral judgements with Anthony Giddens' (1984) distinction between practical and discursive consciousness and Pierre Bourdieu's (e.g. 1984) notion of habitus. Moreover, Vaisey (2009, pp. 1685–1687) utilized the notion of cultural schema, borrowed from cognitive anthropologists Strauss and Quinn (1997, chapter 3), to provide a cognitive mechanism through which culture influences moral actions of individuals. His key idea was that the internalized cultural schemas of a person are instances of implicit cognition that exist in the form of "deep, largely unconscious networks of neural associations that facilitate perception, interpretation, and action" (Vaisey, 2009, p. 1686) and, thereby, provide a cognitive grounding for the person's habitus that explains relative stability and consistency of her actions. Hence, Vaisey's (2009, p. 1687) model of culture in action assumes that moral actions of individuals are primarily caused by their internalized cultural schemas that are implicit, while admitting that people are capable of providing all kinds of post-hoc rationalizations in order to justify their actions to themselves and others. These explicit discursive rationalizations and justifications only seldom identify the motivating causes of actions, which is the main reason why Vaisey (2009, pp. 1687–1689) contends that interviewing methods are not very useful for developing or empirically testing explanations of action (for a similar view, see Martin, 2010). Swidler's (1986) and DiMaggio's (1997) mistake, according to Vaisey (2009), was that they failed to adequately address how implicit and relatively coherent cultural schemas of individuals motivate their actions even though the individuals' justifications for their actions tend to be highly context-dependent and incoherent over time and across different contexts.

Vaisey's (2009) model has been highly influential in IT although some of his views have also been criticized by other advocates of IT. The critiques have mainly addressed three issues. First, Vaisey's version of the dual process model has been regarded as problematically dichotomous in the sense that it does not pay enough attention to the interactions of implicit and explicit cognitive mechanisms in action-related cognition (e.g. Leschziner, 2019; Vila-Henninger, 2015; Winchester, 2016). Second, his suggestion to use surveys to measure implicit cultural schemas has been widely criticized (e.g. Hunzaker & Valentino, 2019; Leschziner, 2019; Miles et al., 2019). Third, Ignatow (2021, pp. 1256–1258) has recently argued that the dual process model, understood

as a general framework for cognitive sociological research, is not supported by empirical evidence produced in cognitive neuroscience using brain imaging nor evidence about brain anatomy and physiology although he does not deny that dual-process models regarding specific empirical phenomena may still be useful for cognitive sociologists.

In order to address the two first critiques, advocates of IT have proposed more interactive versions of the dual process models of culture in action (e.g. Cerulo, 2018; Leschziner & Brett, 2019; Vila-Henninger, 2015; Winchester, 2016), more elaborate accounts of cultural schemas (e.g. Boutyline & Soter, 2021) or cultural models (Rotolo, 2021) and new methods for analyzing implicit cultural schemas (e.g. Hunzaker & Valentino, 2019; Miles, 2019). For example, some cognitive sociologists have been enthusiastic about the possibilities of Implicit Association Test (IAT) and Affect Misattribution Procedure (AMP) for researching implicit cultural schemas and utilized them in their empirical studies (e.g. Miles, 2019; Miles et al., 2019). However, Hunzaker and Valentino (2019) remain skeptical about the possibility to use either surveys or IAT and AMP alone to measure relational cultural schemas. In order to better capture the relational nature of cultural schemas, they have developed a concept-association-based approach for data collection that they combine with various experimental and statistical methods to measure the cultural differences in the organization of cultural schemas in the minds of individuals. In a recent article, Boutyline and Soter (2021) draw from the cognitive sciences in order to specify the meaning of the concept of cultural schema. They propose a useful distinction between the functional, algorithmic and biological (or neural) accounts of cultural schemas that are not always clearly distinguished from each other in IT (Boutyline & Soter, 2021, pp. 732–733). They suggest that cultural schemas at the functional level can be most fruitfully defined as "socially shared representations deployable in automatic cognition" (Boutyline & Soter, 2021, p. 730) and discuss the possibilities and constraints of different methods for measuring cultural schemas at the algorithmic level. Taken as a whole, at least the specificity of the accounts of cultural schemas and the complexity of the methods for measuring them have increased since the publication of Vaisey's (2009) article.

A partly different stream of IT consists of those cognitive sociologists who have emphasized the embodiment of human cognition. For example, Gabe Ignatow (2007, p. 115) synthesized embodied cognition approaches and recent work in the sociology of the body in order to argue that "greater recognition of the bodily foundations of culture and cognition can lead to promising new directions for cultural sociology" that would advance our understanding how culture influences action. In order to reorient cognitive sociology towards a multimodal understanding of knowledge and cultural cognition, Ignatow (2007) reviewed developments in embodied cognitive science, including Barsalou's (e.g. 1999) theory of perceptual symbols, Damasio's (e.g. 1994) work on the role of bodily emotions in reasoning and decision-making, and cognitive linguists' work on cultural models, image schemas, and conceptual metaphors (e.g. Lakoff & Johnson, 2003). The methodological and theoretical ideas pertaining to these views have been further elaborated and employed in Ignatow's (e.g. 2009, 2015, 2021) more recent articles as well as in many other theoretical and empirical contributions of the advocates of IT (e.g. Cerulo, 2018, 2019; Cerulo et al., 2021; Leschziner & Brett, 2019; Rotolo, 2021; Winchester, 2016). For example, Ignatow (2009) combined qualitative and quantitative methods in order to study embodied metaphors used in on-line moral discourses in secular and religious internet support groups for overeaters. One of his findings was that metaphors pertaining to cleanliness and purity were used more often in discourses of the religious support group compared to discourses in the secural support group. Daniel Winchester (2016) in turn used ethnographic methods to study embodied religious metaphors of Orthodox converts engaged in fasting. His central finding was that these

converts linked their bodily experiences pertaining to food, hunger and appetite to more abstract religious concepts, such as soul, sin and religious virtue, enabling them to invest these abstract concepts with embodied metaphorical meanings that affected their actions.

The most ambitious theoretical application of the embodied approaches to cultural cognition can be found from Omar Lizardo's taxonomy of different forms of public and personal culture that he has developed in a series of recent articles (e.g. Lizardo, 2012, 2015, 2017, 2021; Lizardo et al., 2020). Lizardo's theoretical contributions are built upon the assumption that, while "external [or public] cultural symbols are bipolar couplings of form and meaning" (Lizardo, 2015, p. 597), it is embodied individuals who give meaning to external cultural symbols, not the other way around. In the embodied account, "the meaningful component of mental experience is primarily made up of repeated, embodied simulations over previous experiences" (Lizardo, 2015, p. 579) and the meanings of linguistic and other abstract symbols are thereby explained by grounding them in the experiences of embodied individuals (Lizardo, 2015, p. 579; see also; Ignatow, 2015; Lizardo, 2021). This means that people are assumed to "internally reconstruct" the meanings of external (or public) symbols and the contents of their conversation partner's utterances (Lizardo, 2021). In addition to providing an embodied account of public cultural meanings, Lizardo (2017, 2021) has proposed a distinction between declarative and non-declarative personal culture in order to systematize analytical concepts used by cognitive and other cultural sociologists. The basic idea of this distinction is that declarative culture is encoded in long-term memory in the form of propositions that can be expressed by using language while non-declarative culture is encoded in the form of multimodal and multidimensional networks of associations and embodied skills that cannot be linguistically expressed. Lizardo (2017) argues that these differences in encoding reflect differences in the ways in which these two forms of culture are acquired, since non-declarative culture (e.g. a skill of riding a bicycle) is acquired slowly through many bodily exposures and training episodes while symbolically mediated declarative culture (e.g. a proposition that the earth revolves around the sun) is acquired through conscious learning that usually happens much more rapidly than learning of non-declarative culture.

Furthermore, to explain institutionalized and ritualized forms of social action, Lizardo (2015, p. 580) invokes the potential of cultural symbols to provide external scaffolding for embodied actors that allows them to coordinate their actions and interactions over time, but unlike Clark (1997, pp. 179–218), he interprets these scaffoldings in non-cognitive terms. Lizardo and Strandt (2010, p. 209) explicate this interpretation by stating that "cognitive processes must have a concrete location and cannot float around unmoored outside of the person's skin." It seems to us that this commitment, according to which cognition must be located within "the person's skin", explains why Lizardo et al. (2020, p. 5) subscribe to the psychoneural identity hypothesis according to which "states and processes potentially describable in psychological language are (type) identical to states and processes describable in neural language". However, it should be noted that they combine this view with the notion of "wide realization" which they describe as "the idea that a complex interplay of both brain-bound and extracranial processes contribute to generate the core socio-cultural phenomena, in particular, those dependent on social interaction, material artifacts, and the intersubjective coupling of multiple agents" (p. 6). The notable feature of this view is that it seems to water down the original idea of extended mind and distributed cognition since intracranialists do not have to deny this type of wide realization of *socio-cultural* phenomena. By contrast, the debate concerning extended mind and distributed cognition have mostly concerned the question of whether *the cognitive processes and mechanisms underlying cultural cognition* can have components that are located outside the person's skin. It seems to us

that Lizardo and his colleagues' answer to this question is negative. We will soon come back to the implications of this view.

3.4 | Evaluation of the interdisciplinary tradition

We think that interdisciplinary cognitive sociologists have brought fresh theoretical ideas about cognitive mechanisms to cultural sociology from the cognitive sciences and suggested important corrections to CT's and many other cultural sociologists' problematic assumptions about cognition. From the perspective of mechanistic explanation, IT has also been a progressive research tradition in the sense that its assumptions about cognitive mechanisms have become more accurate and comprehensive over time and it has corrected problematic methodological assumptions. However, we think that there are still certain challenges and limitations in IT's accounts of cognitive mechanisms and cultural cognition.

First, many of interdisciplinary cognitive sociologists' accounts of cognitive mechanisms remain somewhat limited, reflecting their selective focus on the specific research programs in cognitive psychology and embodied cognition. Their models about cognitive mechanisms through which culture influences actions are typically gray box sketches rather than glass box mechanism schemas, since they do not specify the nature of mental representations in detail nor do they identify the material components and temporal stages of cognitive mechanisms. For example, Vaisey's (2009) dual-process model and many of its variations are cases in point, since, as also Boutyline and Soter (2021) argue, these models define cultural schemas in different, partially incompatible and to some extent ambiguous ways. The components of the cultural schema mechanism may be described in different models in terms of their functional roles in actions of individuals, in terms of information processing algorithms that govern their operations, or in terms of neural processes that realize these operations without clearly separating these descriptions from one another (Boutyline & Soter, 2021). However, these limitations and ambiguities are sometimes obscured by the terminology used by the advocates of IT, since they may refer quite loosely to neural mechanisms (e.g. Cerulo, 2010) even though the mechanistic models they discuss assume either a functionalist account of cognition or be based on the networks of artificial neurons that provide an algorithmic model of cognitive mechanisms. In addition, there seems to be confusion about whether, or in what sense, cultural schemas are representations. For example, Boutyline and Soter (2021, p. 737) suggest that cultural schemas are representations in the symbolic sense while Vaisey (2009) and his followers deny precisely this account when they emphasize the implicit nature of cultural schemas. In order to avoid conceptual inaccuracies of this kind, IT should pay more attention to the diversity of competing definitions, models and research programs in the cognitive sciences.

Second, Vaisey's (2009) and his followers dual-process models of culture in action and the idea of culturally variable embodied metaphor (e.g. Ignatow, 2007; Rotolo, 2021; Winchester, 2016) assume that groups of individuals have acquired or internalized the same implicit cultural schemas and embodied metaphors through social learning during their cognitive development. However, these authors have not provided detailed models about cognitive and developmental mechanisms operating in these social learning processes (however, see Lizardo, 2017, 2021; Cerulo et al., 2021). This is a serious problem since for example Turner (1994, 2002) has criticized practice theories in the social sciences for their postulation of the implicitly learned cognitive dispositions, presuppositions, schemas and frameworks shared by groups of people, while failing

to specify any plausible and reliable cognitive mechanism through which their implicit social learning or transmission could happen.

Lizardo (2007) has answered Turner's (1994) critique by arguing that the mirror neuron system provides a direct neurocognitive mechanism that allows for implicit transmission and sharing of implicit cultural cognition for embodied individuals. Lizardo's (2007, p. 343, italics in the original) argument implies that "*any social setting that acts directly upon the body for a given collective will necessarily result in the sharing of similar 'practical presuppositions' of the world.*" In other words, groups of embodied individuals end up sharing the same practical skills, implicit dispositions and implicit representations in specific social settings since they implicitly acquire them by directly simulating other group members' actions. Embodied simulations of this kind are, according to Lizardo (2007, pp. 327–346), enabled by the operations of the mirror neuron systems. Lizardo (2007) takes his argument to provide a conclusive defense of the social practices theories that repudiates Turner's (1994, 2002) critiques (cf. Cerulo et al., 2021, pp. 65–66; Lizardo, 2017, 2021).

However, Turner (2007) has responded Lizardo's defense by arguing that the mirror neuron system provides a neural mechanism underlying *universal* social cognition that cannot perform the transmitting functions that Lizardo (2007) ascribes to it. Turner's (2007) main point is that the discovery of mirror neurons provided a plausible answer for explanatory questions concerning the universal ways in which humans understand each other's actions that should be distinguished from the issues pertaining to the transmission of the collective cognitive elements, such as habituses, practical skills, schemas, presuppositions, and the like (Turner refers to these all by using the term "practice"), that vary culturally and are shared by groups of individuals:

> Mirror neurons are shared by the perceptual and action systems [of particular individuals]. The question what is [socially] shared with other organisms is a separate question. If what is shared is the Kantian manifold, i.e. some universal set of starting points, such that the act of grasping, [the mirror neuron literature provides] an argument to that underlying semantic content is a set of given starting points that are [universally] shared. But this reasoning doesn't help with practices, which are by definition not universal, or with concepts, which is a more salient issue for this literature, with similar implications. (Turner, 2007, p. 362, p. 362)

Hence, according to Turner (2007, p. 367), contemporary cognitive science shows that human beings are "powerful emulators and simulators who are particular good at using simulation to fill in missing data", especially about other people and their actions. But Turner (2007) maintains that these facts, contra Lizardo's (2007) claims, do not support the assumption that an embodied individual would be able to implicitly acquire an implicit cognitive element (e.g. a specific class habitus) that is assumed to be socially shared by the members of a particular group (e.g. a working class) by simply perceiving and simulating other members' actions. By contrast, social learning of practical skills, habits and abstract concepts for Turner (1994, 2007) is an error-prone, unreliable and slow process that involves feedback (cf. Boutyline & Soter, 2021). This makes idiosyncratic learning histories of individuals relevant for explaining the cognitive similarities and differences of individuals. Turner's (2007, pp. 353–354) critique also highlights the problem of making inferences about implicitly shared cognitive elements on the basis of observable behavior of individuals, since this type of inferences are always underdetermined by the available observational data. This means that similar behaviors of individuals could be generated by different learning histories and, therefore, the claim that they are *necessarily* generated by the socially

shared and implicit presuppositions, or some other social shared cognitive elements postulated in practice theories, is not true.

In our view, the debate concerning the mirror neuron systems shows at least that the advocates of IT should specify how they see the relation between social and cultural cognition. Furthermore, in order to specify their ideas about how cultural cognition is socially learned, they could consult recent research in developmental psychology that has addressed the cognitive development of individuals, including the social learning mechanisms that operate in the cognitive development of cultural cognition (e.g. Karmiloff-Smith, 1996; Tomasello, 2019). Some recent articles have taken first steps into this direction (e.g. Cerulo et al., 2021; Lizardo, 2017, 2021). For example, Lizardo's (2021) distinctions between the processes of socialization, internalization and enculturation seem to provide useful conceptual tools to address these issues but more work is still required. In addition, one could ask whether people can share cognitive elements that are partially located outside their skins. This question brings us to our final point.

Third, many advocates of IT have accepted Lizardo's (2017) distinction between declarative and non-declarative personal culture, which can be understood as two forms of cultural cognition. However, it is not clear whether or to what extent advocates of IT accept the idea that cultural cognition may also be located in the *cognitive* affordances of artifacts and material environments. By cognitive affordances, we refer to those relational properties of artifacts and material environments that allow people with suitable cognitive skills to use them as external representations that help them to perform cognitive tasks (e.g. Hutchins, 1995). Many advocates of IT tend to downplay the importance of the cognitive affordances of this kind since they seem to assume that all components of cognitive mechanisms are necessarily located within individuals' skins (Norton, 2020). This is somewhat surprising since distributed cognitive mechanisms have been systematically theorized and empirical studied in ecological psychology, cognitive anthropology and cognitive archeology since 1990s (e.g. Hutchins, 1995; Malafouris & Renfrew, 2010; Norman, 1993). These studies have relied mostly on ethnographic methods in order to show that the affordances of cognitive artifacts (e.g. navigation charts, physical scale models or diagrams) that are the objects of joint attention for many people at the same time (and in this sense "socially shared") are important components of their materially and socially distributed cognitive mechanisms. The cognitive affordances of artifacts and culturally designed material environments also provide important developmental scaffolds for learning cognitive skills, such as writing, reading, navigation and arithmetic. More recently, the concept of affordance has also been incorporated into a predictive processing framework in cognitive neuroscience that aims to account for cultural cognition (e.g. Veissière et al., 2020). An interesting issue with respect to cognitive sociology is the question of to what extent outsourcing (or offloading) cognition to cognitive artifacts, information processing technologies and culturally built material environments saves us from the need to form detailed internal representations about our environments. It seems to us that distributed cognitive mechanisms have become more important to understanding of cultural phenomena as our societies have become more impregnated by information processing technologies.

In conclusion, we summarize the previous discussion by describing IT's answers to the three questions that we posed above. Since the two main empirical research programs in IT provide slightly different answers to these questions, we describe their answers separately. However, we admit that these programs are partially overlapping and that their answers may be complementary rather than contradictory.

3.5 | The dual-process research program

1. Culture influences action via two different types of cognitive mechanisms. The first is implicit cultural schemas that are socially learned and the second is conscious shaping of the explicit discursive accounts that people use to justify their actions.
2. Cultural cognition comes in two forms, implicit and explicit, and the most important element of implicit cultural cognition consists of cultural schemas. The relation between cultural and social cognition is not specified.
3. Internalized culture takes two forms, implicit and explicit, whose relations are described differently in different models.

3.6 | The embodied metaphors research program

1. Culture influences action through conceptual metaphors that utilize socially mediated experiences of embodied individuals in order to provide meanings for abstract concepts that are shared by the groups of individuals.
2. Cultural cognition consists of embodied conceptual metaphors that vary between groups. The relation between cultural and social cognition is not specified.
3. Internalized culture takes the form of embodied conceptual metaphors that vary between groups.

4 | CONCLUSION

In this article, we analyzed the cultural and the interdisciplinary tradition of cognitive sociology and evaluated their cognitive and methodological assumptions from the perspective of the mechanistic theory of explanation and some recent developments in the cognitive sciences. We have collected our main results in Table 1. Our contention is that the interdisciplinary tradition is more promising, since its models about cognitive mechanisms have become more accurate and comprehensive over time. This tradition has also been methodologically innovative and included critical reflections about the methods used in cognitive sociology and, more generally, in cultural sociology. By contrast, the theoretical and methodological ideas of cultural tradition have not developed much since Zerubavel's (1997) textbook that largely synthesized earlier work in the sociology of knowledge and social constructionism. Since the cultural tradition has continued to keep distance from the cognitive sciences, it has not been able to open up the black box of cognitive mechanisms that are assumed by its theories. Moreover, as have been argued by the advocates of interdisciplinary tradition, the central problem in cultural tradition is that its basic cognitive assumptions are not compatible with the recent developments of the cognitive sciences that have increasingly addressed the embodied, social and cultural aspects of human cognition. This is not to deny that cultural cognitive sociologists have provided important empirical descriptions of various cultural phenomena.

However, we also argued that there are certain conceptual inaccuracies and limitations in the interdisciplinary tradition. First, we noted that models about cognitive mechanisms in the interdisciplinary tradition can be characterized as gray box mechanism sketches rather than glass box mechanism schemas. Second, we argued that the interdisciplinary tradition has not yet provided a satisfactory account of the social learning and developmental mechanisms through which

TABLE 1 An assessment of two traditions of cognitive sociology from the perspective of mechanistic theory of explanation

	Evaluation of the models about cognitive mechanisms	Significant problems and unsolved questions	Avenues for improvement
Cultural tradition	Black box sketches and no serious attempts to increase their transparency	Black box sketches of cognitive mechanisms do not provide mechanistic explanations for cultural phenomena. Does not clearly distinguish between mechanisms for social and cultural cognition	Becoming more informed by recent developments in the cognitive sciences could enable it to provide better explanations and more satisfactory answers to the questions it poses
Interdisciplinary tradition	Mostly gray box sketches in terms of cultural schemas and embodied metaphors	Models about cognitive mechanisms are drawn from a few specific research programs in the cognitive sciences. Limited understanding of social learning processes and the distributed aspects of cognitive mechanisms. Does not clearly distinguish between mechanisms for social and cultural cognition	By widening the scope of the relevant cognitive scientific research to include research on social learning and developmental mechanisms and distributed cognition

groups of people end up sharing the same elements of cultural cognition, such as cultural schemas or embodied metaphors. Third, the materially and socially distributed aspects of cognitive mechanisms have not yet been adequately addressed in the interdisciplinary tradition. Although these are all complex issues, we hope that our article encourages interdisciplinary cognitive sociologists to address them.

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ENDNOTES
[1] A similar two-fold distinction has been often made in the literature on cognitive sociology. For example, in their introduction to *The Oxford Handbook of Cognitive Sociology*, Brekhus and Ignatow (2019, p. 1) refer to "a contrast between cultural cognitive sociology approaches and interdisciplinary cognitive social science approaches" (see also Danna, 2014; Lizardo, 2015).

[2] We use the notion of "information processing" in a non-committal way, meaning that we leave it open what exactly it consists of and where it is located. The point of our distinction between social and cultural cognition is simply to specify two broad classes of cognitive phenomena that are relevant for cognitive sociological research.

[3] Zerubavel (1997) relies on the structuralist semiology that is rooted in structuralist linguistics, where the meaning of a symbol is exhaustively determined by its relations to other symbols. He writes, for example, that symbols "basically derive their distinctive meanings from the way in which they are semiotically contrasted in our minds with other symbols" (p. 73). This account has little place for embodied experiences in the formation of symbolic meaning.

REFERENCES

Amodio, D., & Devine, P. (2006). Stereotyping and evaluation in implicit race bias: Evidence for independent constructs and unique effects on behavior. *Journal of Personality and Social Psychology*, *91*, 652–661. https://doi.org/10.1037/0022-3514.91.4.652

Barsalou, L. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences*, *22*, 577–660. https://doi.org/10.1017/S0140525X99002149

Bechtel, W. (2008). *Mental mechanisms: Philosophical perspectives on cognitive neuroscience*. Routledge.

Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*. Routledge & Kegan Paul.

Boutyline, A., & Soter, L. K. (2021). Cultural schemas: What they are, how to find them, and what to do once you've caught one. *American Sociological Review*, *86*, 728–758. https://doi.org/10.1177/00031224211024525

Brekhus, W. (2007). The Rutgers school: A Zerubavelian culturalist cognitive sociology. *European Journal of Social Theory*, *10*, 448–464. https://doi.org/10.1177/1368431007080705

Brekhus, W. (2015). *Culture and cognition: Patterns in the social construction of reality*. Polity Press.

Brekhus, W. H., Brunsma, D. L., Platts, T., & Dua, T. (2010). On the contributions of cognitive sociology to the sociological study of race. *Sociology Compass*, *4*, 61–76. https://doi.org/10.1111/j.1751-9020.2009.00259.x

Brekhus, W. H., & Ignatow, G. (2019). Cognitive sociology and the cultural mind: Debates, directions, and challenges. In W. H. Brekhus & G. Ignatow (Eds.), *The Oxford handbook of cognitive sociology* (pp. 1–27). Oxford University Press.

Cerulo, K., Leschziner, V., & Shepherd, H. (2021). Rethinking culture and cognition. *Annual Review of Sociology*, *47*, 63–85. https://doi.org/10.1146/annurev-soc-072320-095202

Cerulo, K. A. (2010). Mining the intersections of cognitive sociology and neuroscience. *Poetics*, *38*, 115–132. https://doi.org/10.1016/j.poetic.2009.11.005

Cerulo, K. A. (2018). Scents and sensibility: Olfaction, sense-making, and meaning attribution. *American Sociological Review*, *83*, 361–389. https://doi.org/10.1177/0003122418759679

Cerulo, K. A. (2019). Embodied cognitive sociology: Sociology's role in bridging mind, brain, and body. In W. H. Brekhus & G. Ignatow (Eds.), *The Oxford handbook of cognitive sociology* (pp. 81–100). Oxford University Press.

Clark, A. (1997). *Being there: Putting brain, body, and world together again*. MIT Press.

Craver, C., & Darden, L. (2013). *In search of mechanisms: Discoveries across the life sciences*. University of Chicago Press.

Damasio, A. R. (1994). *Descartes' error: Emotions, reason, and the human brain*. Putnam's Sons.

Danna, K. (2014). The study of culture and cognition. *Sociological Forum*, *29*, 1001–1006.

DeGloma, T. (2015). The strategies of mnemonic battle: On the alignment of autobiographical and collective memories in conflicts over the past. *American Journal of Cultural Sociology*, *3*, 156–190. https://doi.org/10.1057/ajcs.2014.17

DiMaggio, P. (1997). Culture and cognition. *Annual Review of Sociology*, *23*, 263–287. https://doi.org/10.1146/annurev.soc.23.1.263

Elder-Vass, D. (2012). *The reality of social construction*. Cambridge University Press.

Friedman, A. (2013). *Blind to sameness: Sexpectations and the social construction of male and female bodies*. University of Chicago Press.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. University of California Press.

Glennan, S. (2017). *The new mechanical philosophy*. Oxford University Press.

Hacking, I. (1999). *The social construction of what?* Harvard University Press.

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgement. *Psychological Review*, *108*, 814–834. https://doi.org/10.1037/0033-295X.108.4.814

Hedström, P., & Ylikoski, P. (2010). Causal mechanisms in the social sciences. *Annual Review of Sociology*, *39*, 46–67. https://doi.org/10.1146/annurev.soc.012809.102632

Hunzaker, M. B. F., & Valentino, L. (2019). Mapping cultural schemas: From theory to method. *American Sociological Review*, *84*, 950–981. https://doi.org/10.1177/0003122419875638

Hutchins, E. (1995). *Cognition in the wild*. The MIT Press.

Ignatow, G. (2007). Theories of embodied knowledge: New directions for cultural and cognitive sociology? *Journal for the Theory of Social Behaviour*, *37*, 115–135. https://doi.org/10.1111/j.1468-5914.2007.00328.x

Ignatow, G. (2009). Culture and embodied cognition: Moral discourses in internet support groups for overeaters. *Social Forces*, *88*, 643–669.

Ignatow, G. (2015). Theoretical foundations for digital text analysis. *Journal for the Theory of Social Behaviour*, *46*, 104–120. https://doi.org/10.1111/jtsb.12086

Ignatow, G. (2021). Cognitive sociology after relational biology. *Sociological Forum*, *36*, 1253–1270. https://doi.org/10.1111/socf.12764

Illari, P. M., & Williamson, J. (2012). What is a mechanism? Thinking about mechanisms across the sciences. *European Journal for Philosophy of Science*, *2*, 119–135. https://doi.org/10.1007/s13194-011-0038-2

Kahan, D. M., & Braman, D. (2006). Cultural cognition and public policy. *Yale L. & Pol'y Rev.*, *24*, 147–170.

Kaidesoja, T., Sarkia, M., & Hyyryläinen, M. (2019). Arguments for the cognitive social sciences. *Journal for the Theory of Social Behavior*, *49*, 480–498. https://doi.org/10.1111/jtsb.12226

Karmiloff-Smith, A. (1996). *Beyond modularity: A developmental perspective on cognitive science*. The MIT Press.

Lakoff, G., & Johnson, M. (2003). *Metaphors we live by (with a new afterword)*. The University of Chicago Press.

Leschziner, V. (2019). Dual-process models in sociology. In W. H. Brekhus & G. Ignatow (Eds.), *The Oxford handbook of cognitive sociology* (pp. 169–191). Oxford University Press.

Leschziner, V., & Brett, G. (2019). Beyond two minds: Cognitive, embodied, and evaluative processes in creativity. *Social Psychology Quarterly*, *82*, 340–366. https://doi.org/10.1177/0190272519851791

Lizardo, O. (2007). "Mirror neurons," collective objects and the problem of transmission: Reconsidering Stephen Turner's critique of practice theory. *Journal for the Theory of Social Behaviour*, *37*, 319–350. https://doi.org/10.1111/j.1468-5914.2007.00340.x

Lizardo, O. (2012). Embodied culture as procedure: Rethinking the link between personal and objective culture. In A. Warde & D. Southerton (Eds.), *The habits of consumption. Open Access Book Series of the Helsinki Collegium of Advanced Studies* (pp. 70–86).

Lizardo, O. (2015). Culture, cognition and embodiment. In J. D. Wright (Ed.), *International encyclopedia of the social and behavioral sciences* (pp. 576–581). Elsevier.

Lizardo, O. (2017). Improving cultural analysis: Considering personal culture in its declarative and nondeclarative modes. *American Sociological Review*, *82*, 88–115. https://doi.org/10.1177/0003122416675175

Lizardo, O. (2021). Culture, cognition, and internalization. *Sociological Forum*, *36*, 1177–1206. https://doi.org/10.1111/socf.12771

Lizardo, O., Sepulvado, B., Stoltz, D. S., & Taylor, M. A. (2020). What can cognitive neuroscience do for cultural sociology? *American Journal of Cultural Sociology*, *8*, 3–28. https://doi.org/10.1057/s41290-019-00077-8

Lizardo, O., & Strandt, M. (2010). Skills, toolkits, contexts and institutions: Clarifying the relationship between different approaches to cognition in cultural sociology. *Poetics*, *38*, 205–228. https://doi.org/10.1016/j.poetic.2009.11.003

Malafouris, L., & Renfrew, C. (Eds.). (2010). *The cognitive life of things: Recasting the boundaries of the mind*. McDonald Institute Monographs.

Martin, J. L. (2010). Life's a beach but you're an ant, and other unwelcome news for the sociology of culture. *Poetics*, *38*, 228–244. https://doi.org/10.1016/j.poetic.2009.11.004

Miles, A. (2019). An assessment of methods for measuring automatic cognition. In W. H. Brekhus & G. Ignatow (Eds.), *The Oxford handbook of cognitive sociology* (pp. 342–366). Oxford University Press.

Miles, A., Charron-Chénier, R., & Schleifer, C. (2019). Measuring automatic cognition: Advancing dual-process research in sociology. *American Sociological Review*, *84*, 308–333. https://doi.org/10.1177/0003122419832497

Norman, D. A. (1993). *Things that make us smart: Defending human attributes in the age of the machine*. Addison–Wesley.

Norton, M. (2020). Cultural sociology meets the cognitive wild: Advantages of the distributed cognition framework for analyzing the intersection of culture and cognition. *American Journal of Cultural Sociology*, *8*, 45–62. https://doi.org/10.1057/s41290-019-00075-w

Rotolo, M. (2021). Culture beneath discourse: A conceptual model for analyzing nondeclarative cultural knowledge. *American Journal of Cultural Sociology*. https://doi.org/10.1057/s41290-021-00135-0

Sarkia, M., Kaidesoja, T., & Hyyryläinen, M. (2020). Mechanistic explanations in the cognitive social sciences: Lessons from three case studies. *Social Science Information*, *59*, 580–603. https://doi.org/10.1177/0539018420968742

Strauss, C., & Quinn, N. (1997). *A cognitive theory of cultural meaning*. Cambridge University Press.

Strydom, P. (2007). Introduction: A cartography of contemporary cognitive social theory. *European Journal of Social Theory*, *10*, 339–356. https://doi.org/10.1177/1368431007080699

Swidler, A. (1986). Culture in action: Symbols and strategies. *American Sociological Review*, *51*, 273–286. https://doi.org/10.2307/2095521

Tomasello, M. (2019). *Becoming human: A theory of ontogeny*. Harvard University Press.

Turner, S. P. (1994). *The social theory of practices*. The University of Chicago Press.

Turner, S. P. (2002). *Brains/practices/relativism: Social theory after cognitive science*. The University of Chicago Press.

Turner, S. P. (2007). Mirror neurons and practices: A response to Lizardo. *Journal for the Theory of Social Behavior*, *37*, 351–371. https://doi.org/10.1111/j.1468-5914.2007.00342.x

Turner, S. P. (2018). *Cognitive science and the social*. Routledge.

Vaisey, S. (2009). Motivation and justification: A dual-process model of culture in action. *American Journal of Sociology*, *114*, 1675–1715. https://doi.org/10.1086/597179

Veissière, S. P. L., Constant, A. A., Ramstead, M. J. D., Friston, K. J., & Kirmayer, L. J. (2020). Thinking through other minds: A variational approach to cognition and culture. *Behavioral and Brain Sciences*, *43*, 1–75. https://doi.org/10.1017/S0140525X19001213

Vila-Henninger, L. A. (2015). Toward defining the causal role of consciousness: Using model of memory and moral judgement from cognitive neuroscience to expand the sociological Dual-process model. *Journal for the Theory of Social Behavior*, *45*, 238–260. https://doi.org/10.1111/jtsb.12068

Winchester, D. (2016). A hunger for god: Embodied metaphor as cultural cognition in action. *Social Forces*, *95*, 585–606. https://doi.org/10.1093/sf/sow065

Zerubavel, E. (1991). *The fine line: Making distinctions in everyday life*. Free Press.

Zerubavel, E. (1997). *Social mindscapes: An invitation to cognitive sociology*. Harvard University Press.

Zerubavel, E. (2019). Cognitive sociology: Between the personal and the universal mind. In W. H. Berhus & G. Ignatow (Eds.), *The Oxford handbook of cognitive sociology* (pp. 31–41). Oxford University Press.