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Symbiotic cognition as an alternative for socially extended cognition

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ABSTRACT
According to a promising proposal, cognitive abilities and processes in the context of social institutions should be characterized as socially extended cognition. However, this idea invokes resistance because it seems to invoke metaphysical problems such as a serious variant of the problem of cognitive bloat. In this paper, I argue that defenders of socially extended cognition are not overly worried by such problems because their position is akin to a position known as ‘distributed cognition,’ which avoids these problems. Nevertheless, I will argue that the explanatory aims of socially extended cognition do not correspond to the distributed cognition perspective. The ensuing predicament can be avoided, however, by recognizing that the idea of socially extended cognition hinges on the conflation of two dimensions of the interconnection of the elements in a cognitive system, which I will label ‘functional integration’ and ‘task-dependency.’ Separating these dimensions allows us to identify an overlooked alternative for extended and distributed cognition – symbiotic cognition – that fits cognition in social institutions better than both and avoids the predicament.

1. Introduction
Social institutions greatly enhance the cognitive reach and repertoire of humans. Legal systems, monetary systems, educational systems, and systems of cultural conventions, for example, allow us to perform cognitive operations that are impossible and often inconceivable in their absence. How should we characterize cognitive processes that take place in the context of social institutions? According to a relatively recent proposal, this question can be answered, at least in part, by using the extended cognition framework. Some theorists argue that our cognitive processes are not just extended by artifacts, as is claimed in the original extended mind proposal (Clark & Chalmers, 1998; Menary, 2010), but also by social institutions (De Jaegher, Di Paolo, &
Although I am very sympathetic to the idea of extended cognition, I will argue that the extended cognition framework is not appropriate to characterize the way in which social institutions enable, enhance, and co-constitute cognitive processes. Extended cognition ultimately hinges on the idea that items external to the brain and body are functionally integrated in the overall cognitive system. Functional integration is a causal notion. While social institutions shape our cognition in part through functional integration, the more significant way in which they determine and constitute our cognition is through what I will label task-dependency; roughly, the holistic inter-defining of tasks and roles. Task-dependency is not a causal notion, but a notion that pertains to organization and coordination. In this paper, I will argue that the idea that social institutions extend our cognition mistakenly conflates functional integration and task-dependency. I will propose that social institutions constitute cognitive capacities more principally through task-dependency, and I will label this type of cognition symbiotic cognition.

In order to develop this argument, I will concentrate on Shaun Gallagher’s views on socially extended cognition, which I will introduce in Section 2. In Section 3, I will briefly discuss what may seem to be two serious objections to this idea: the problem of cognitive bloat and the inability to delineate cognitive systems. In Section 4, I will argue that Gallagher is not overly alarmed by these problems, probably because his notion of socially extended cognition overlaps with what Hutchins has labeled distributed cognition. I will explain distributed cognition and argue that it does not fall prey to problems of cognitive bloat or delineation. In Section 5, however, I will argue that on closer inspection, Gallagher’s socially extended cognition cannot count as a form of distributed cognition. Rather than taking a distributed perspective – in other words, asking which individuals contribute to social institutions conceived as cognitive systems – it takes a centered perspective – asking which social institutions contribute to the cognitive processes of individuals. The resulting predicament can be avoided if we can identify a position that is sufficiently similar to distributed cognition to avoid the metaphysical problems of Section 3 and sufficiently different from it to allow for a centered perspective.

Identifying such a position is the aim of Section 6. I will introduce the distinction between functional integration and task-dependency and use it to devise a simple taxonomy of four varieties of scaffolded cognition. One of these is an overlooked possibility of symbiotic cognition, characterized mainly by task-dependency. Symbiotic cognition fits the required profile. It would be a good replacement for socially extended cognition, provided that it explain what socially extended cognition does: (1) how social institutions co-constitute cognitive processes and (2) how this involves...
a substantial degree of cognitive offloading. In Section 7, I will argue that symbiotic cognition explains both.

2. Socially extended cognition

The idea that cognitive processes can be extended by items outside our brains and bodies with which we are causally “coupled” has been defended by many for more than two decades (Clark & Chalmers, 1998; Clark, 2008; Menary, 2010). The original proposal of such active externalism (Hurley, 2010) hinged on the parity principle, according to which processes outside our brains that are functionally similar or equivalent to brain processes contributing to cognition can contribute to – and be constitutive of – our cognition as well. A second wave of extended mind theorists replaced the parity principle with what is known as the complementarity principle: Items external to our brains and bodies can contribute to cognition, not because they structurally resemble processes that also occur inside the brain, but because they complement brain processes and, by doing so, allow for new cognitive capacities (Sutton, 2010).

The complementarity principle allows for a much wider variety of ways to extend cognition than the parity principle. This leeway is what Shaun Gallagher makes use of when introducing and defending the idea of ‘socially extended cognition’ (Gallagher, 2013; Gallagher & Crisafi, 2009). Gallagher argues for the following:

... a liberal, and specifically social extension of the extended mind hypothesis [and] appeal[s] to social practices and institutions that are what we might call ‘mental institutions’ (Gallagher & Crisafi, 2009), in the sense that they are not only institutions with which we accomplish certain cognitive processes, but also are such that without them such cognitive processes would no longer exist. (Gallagher, 2013, p. 6)

Examples include legal systems, educational systems, and museums. Our legal system, for instance, enables an array of thoughts and actions that are unintelligible without the concepts and procedural social routines associated with the law. Consider the practice of formalizing an agreement between two people by signing a contract. The thoughts and actions involved are literally unthinkable without a legal background:

A contract or legal agreement ... is in some real sense an expression of several minds externalized and extended into the world, instantiating in external memory an agreed-upon decision, adding to a system of rights and laws that transcend the particularities of any individual’s mind. Contracts are institutions that embody conceptual schemas that, in turn, contribute to and shape our cognitive processes. (Gallagher, 2013, p. 6)
Mental institutions need not only consist of formal organizations. Cultural norms and practices may also count as such. Gallagher gives the following example:

In solving a problem like keeping my cattle in my pasture, my bodily manipulations of a set of wooden poles and wire are not necessarily part of the cognitive process; but my engagement with the particular local custom/practice of solving this problem with a fence (and even a specific kind of fence) is a cognitive part of the problem solving. In such cases, cultural practices, local know-how in the form of established practices, etc., in either formal or informal ways, enter into and shape the thinking process. Without such cultural practices, rules, norms, etc. our thinking – our cognitive processes – would be different. (Gallagher, 2013, p. 10)

By explicitly linking this proposal to earlier extended mind hypotheses, the suggestion is made that just like Otto’s notebook becomes a part of Otto’s mind, social institutions literally become part of our minds: “Just as a notebook or a hand-held piece of technology may be viewed as affording a way to enhance or extend our mental possibilities, so our encounters with others, especially in the context of various institutional procedures and social practices may offer structures that support and extend our cognitive abilities” (Gallagher, 2013, p. 4). Mental institutions such as legal systems “extend our cognitive processes when we engage with them (that is, when we interact with, or are enactively coupled to them in the right way)” (Gallagher, 2013, p. 6). This makes them part of our cognitive processes: “It is the fact that I am working and engaged in the right way with mental institutions that makes them a constituent part of my cognitive processes” (Gallagher, 2013, p. 9).

It should be noted that the idea that external items literally become part of our minds gets a slightly different interpretation in Gallagher’s work than in the work of Clark and Chalmers. This is due to the fact that Clark and Chalmers apply a generally functionalist outlook so that external items are thought to be part of the “realization base” of functions that define cognitive processes. Gallagher, by contrast, adopts an enactivist conception of cognition, according to which cognition is a specific type of engagement with the world. On his view, to be part of a cognitive process is to be part of a process in which an individual engages with the world. These differences should not be exaggerated, however, when interpreting the claim that social institutions are literally a part of our cognitive processes. Gallagher’s notion of ‘constitution’ – employed in the idea that institutions are a “constitutive part” of our cognitive processes – is derived from De Jaegher et al. On their notion of ‘constitution,’ “P is a constitutive element [of X] if P is part of the processes that produce X” (De Jaegher et al., 2010, p. 443). ‘Producing,’ on their view, means simultaneously co-occurring with and bringing about the produced phenomenon (cognition, in our case): “The set of all the constitutive elements is the phenomenon itself” (De Jaegher et al., 2010, p. 443). This
suggests that if social institutions constitute cognitive processes, then they are literally a part of these processes.

3. Two problems

Classic attacks on the extended mind hypothesis involve defenses of internalist, cognitivist characterizations of cognition. They rely on the idea that the real “mark of the mental” is the existence of non-derived mental content and that causal coupling between brains and external items should not be mistaken for co-constituting cognition (Adams & Aizawa, 2001, 2008, 2010). I will set these arguments aside. Not only are there strong counter arguments (e.g., Clark, 2010; Menary, 2007) and not only is the idea of non-derived content highly controversial (e.g., Dennett, 1987; Hutto & Myin, 2013, 2017), the point is more that these arguments are not specifically aimed at socially extended cognition. Moreover, since I will eventually argue (in Sections 5 and 6) that what Gallagher and others label ‘socially extended cognition’ is not just an extension of the idea of extended cognition, these criticisms will turn out to be irrelevant.

One serious line of criticism that is relevant is voiced by Richard Menary. On his ‘cognitive integration’ view, “institutions ... are usually enabling or background conditions for cognitive processing” (Menary, 2013, p. 27; see also Huebner, 2013). Menary draws the line: The complementarity principle allows us to invoke a wide variety of ways to think of the mind as being extended, but we need to stop somewhere. This worry is akin to what Robert Rupert (2004) calls ‘cognitive bloat’. Menary (2013, p. 32) mentions the example of BBC news. Does the fact that he uses BBC news as his main source of information about the situation in Syria imply that BBC news is part of his mind? According to many that would be absurd; it is much more intuitive to think of it as part of the background against which his mind is able to function as it does.

To be sure, this problem is intuitive and does not constitute a logical objection to the idea of socially extended cognition. It becomes more salient when we speak of a socially extended ‘mind’ rather than ‘cognition’ and when we think of cognitive extensions as ‘parts of minds.’ The idea that BBC is a proper part of my mind – the locus of control of my body, and the seat of my thoughts, memories, personality, and identity – sounds more counter-intuitive than the idea that BBC extends my cognitive processes. Thus, much depends on being precise about characterizing the relation between persons and social institutions and on the question of whether ‘extension’ is the best metaphor to characterize this relation.

Gallagher recognizes the threat of cognitive bloat but defends extension terminology. He urges us not to exaggerate the extent to which institutions really are a part of our minds: “Only so far as I am properly engaged with
these institutions (or with notebooks or pieces of technology) do they contribute to the constitution of my cognitive processes. If I am not engaged with them (just as some neuronal processes in my brain may remain unactivated in specific circumstances), then they are not cognitively activated” (Gallagher, 2013, p. 9–10). Structural coupling is here replaced with dynamical coupling and uncoupling. However, is this the right move to allay the intuitive worry? Even if we do not count the decoupled parts of social institutions, when a judge is coupled with the legal system – say, when she is gathering information from barristers and colleagues and consulting documents on cases similar to the one she will have to rule on – are her thought processes going on in parts of the legal system?

Apart from the width of extension, there are further worries. For one thing, where do we draw the boundary of the relevant part of the legal system (see., Ludwig, 2015)? The opinions of colleagues and barristers depend on information provided by still others, on documents that they have read and testimonies they have heard. What, exactly, is the judge supposed to be coupled with?

What causal interactions would this coupling consist of? Surely, such questions are difficult to answer, even if we do not ask for a high degree of precision. There is currently an interesting debate on how to draw the boundaries of cognitive systems viewed from the extended mind perspective (Van Eck & Looren de Jong, 2016). The most prominent proposal that is on the table is a mechanistic criterion based on Craver’s idea that parts of mechanisms and mechanistic wholes should be mutually manipulable (Craver, 2007; Kaplan, 2012; Krickel, 2018). But whether such a criterion can be used to demarcate systems as wide as they are now proposed to be by the socially extended mind hypothesis is an open question at best; the systems discussed in the debate on the boundaries of extended systems are considerably less wide. Moreover, the mechanistic view it is based on is generally not welcomed by those who defend the enactivist view on cognition that underlies the idea of socially extended cognition (Kirchoff, 2017).

Thus, to sum up, there seem to be at least two intuitive worries associated with socially extended cognition: (1) cognitive bloat and (2) the lack of a clear demarcation of the boundaries of the socially extended mind. I will not discuss the question of whether these objections are lethal to Gallagher’s proposal. The point of bringing them up at this stage is to interpret the notion of ‘socially extended cognition’ further.

4. Distributed cognition

Gallagher is not overly alarmed by these problems. One plausible reason for this is that many descriptions he gives of socially extended cognition portray it as being very similar to what is known as ‘distributed cognition.’ I will discuss these descriptions in the next section. In this section, I will introduce
distributed cognition and argue that it is not susceptible to the problems mentioned in the previous section.

Distributed cognition involves (but is not limited to) the idea that cognitive processes can be dispersed over a group of individuals. It is also known as ‘collective cognition’ or ‘macrocognition’ (Huebner, 2014). This type of cognition was highlighted most prominently by Edwin Hutchins (Hutchins, 1995), though Michaelian and Sutton (2013) trace the idea back to Vygotsky, among others, and Cole and Engeström (1993) argue that it has been part and parcel of psychology from Wundt onwards. Hutchins’ main example is that of a team of people navigating a marine vessel. This navigation can best be understood as one cognitive task, even though a number of individuals contribute to it in narrowly specified ways. Other defenders of the idea have claimed that collective memory is a good example (Donald, 1991; Michaelian & Sutton, 2013; Sutton, 2010). It has been proposed, for example, that married couples are able to remember events together that they cannot remember equally well individually (Theiner, 2013; Wegner, 1986; Wegner, Raymond, & Erber, 1991). Further examples of distributed cognition involve various lab experiments in which people can only solve problems together (Theiner, Allen, & Goldstone, 2010).

Distributed cognition is often compared to and connected or even integrated with extended cognition (Clark, 1996). However, there is an important difference. The central contrast in the debate on extended cognition is that of internalism versus (active) externalism: Should we or should we not view external items that our brains are coupled with as part of our cognitive processes? The central contrast in the distributed cognition literature is a centered perspective on the cognition of individuals (or individual elements of a system) versus a distributed perspective on the interconnection of collaborating individuals (or interconnected elements of a system). In Hutchins’ words, “distributed cognition is not a kind of cognition; it is a perspective on all of cognition” (Hutchins, 2014, p. 36). From this perspective, cognition emerges from the interaction between distributed processes, with no process or set of processes that is the center or hub of the overall cognitive process. In principle, such a perspective can be adopted on all scales. To illustrate this point, Hutchins mentions computer models of language acquisition in groups of people and compares them to the problem of how visual modules in the brain learn to communicate the information needed to recover depth from stereo vision without having a teacher: “It turns out that the problem of how a community can learn a lexicon without a teacher to specify the elements of a lexicon is very similar to the problem of how various brain areas might learn to communicate without a teacher to specify the form of information to exchange” (Hutchins, 2014, p. 38).

Even though the idea of distributed cognition can be applied on all scales, it is best known for its application at the scale of groups of people – such as
in the marine vessel example or the example of pilots collaborating in an airplane cockpit – for these types of examples stretch the meaning of ‘cognition’ beyond the traditional boundaries of the skull. In this respect, distributed cognition is like extended cognition. However, in contrast to Clark and Chalmers’ original extended mind hypothesis, the idea here is not that the items external to the brain and body of a person literally become part of that person’s mind. The idea, rather, is precisely to forgo such centering on one brain, one mind, or one person. This point is crucial in connection with the two problems of the previous section, as those problems arise from a perspective that centers on a single situated person.

If Gallagher’s socially extended cognition can be reinterpreted as a form of distributed cognition, it would be relatively immune to the objections leveled against socially extended cognition. For one thing, the problem of cognitive bloat would disappear. Nothing in the idea that social institutions are distributed cognitive systems suggests that social institutions are a part of individual minds. The idea is not that individual minds or brains are coupled with (large parts of) institutions in exactly the same way that Otto is coupled with his notebook. To play your part as a teacher in an educational system or as a judge in a legal system is a much more complex and versatile relationship – if only because a social institution is quite a different item from a notebook. This does not mean that a judge’s cognition is less tightly connected with a legal system than Otto is with his notebook. In fact, it might, arguably, be the other way around: The cognitive tasks of a judge are not just aided, enhanced, or made possible by the system she is a part of – as Otto’s memory is by his notebook – they are created by the system (more on this in Sections 5–7). The point, however, is that to claim this is not necessarily to claim that the system, or a large part thereof, is part of the judge’s mind. Just like Richard Menary’s mind is not co-constituted by BBC and a teacher’s mind is not extended by her calculator and a large chunk of the educational system.

The problem of vague boundaries might be a bit less easy to get rid of, for there are, in all likelihood, different ways of drawing the boundaries of systems that are widely distributed, like legal systems and educational systems. However, drawing the boundaries of a distributed system is not the same problem as deciding what to include in a Clark-and-Chalmers-style extended cognitive system. The latter problem requires a principled stance on when external items can be considered to be literally part of an individual’s mind. However, in order to determine the boundaries of a socially distributed system such as a legal system or an educational system, we do not need such principled metaphysical choices. Hence, even though the problem of vague boundaries is not solved, the sting is taken out of the problem is not acute cognition proposal as a form of distributed cognition. The question, however, is whether such an interpretation is feasible.
5. A predicament

The main reason for thinking that Gallagher’s notion of socially extended cognition is similar to Hutchins’ notion of distributed cognition is that Gallagher stresses the extent to which cognitive processes that are constituted by social institutions are intelligible only within the context of such institutions. They exist only because they are part of the functioning of larger systems of interacting individuals. The quote on contracts in Section 2 is a case in point. The point is also clearly made when Gallagher describes the cognition involved in reaching a legal judgment:

These cognitive practices are such that in principle they could not happen just in the head. Even in the case of a highly trained attorney who seemingly does her legal reasoning in her head, what she does, and what makes it the kind of cognition that it is, depends not only on the fact that she has previously engaged in the workings of the legal system ..., but on the ongoing workings of the legal system since what she engages in, i.e., the particular cognitive process of forming a legal judgment, is what it is only in that system. (Gallagher, 2013, p. 7; italics in the original)

Legal systems, educational systems, but also systems of cultural conventions consist of tasks and roles that are inter-defined and that jointly make up these systems. As such, these systems are very much like Hutchins’ distributed cognitive systems. It may be remarked here that it would be a bit of a stretch to call these systems cognitive systems, but then again, in more recent work, Hutchins (2014) applies his distributed cognition approach to what he calls “the cultural ecosystem of human cognition,” which consists mainly of cultural practices and social institutions. Hence, we may put this point aside.

Distributed cognition differs from extended cognition in that it is not a kind of cognition but, rather, a perspective on cognition and that it does not take a centered perspective. However, the overlaps between the two approaches are considerable. Hutchins confirms this: “When the focus is on systems that involve the interaction of persons with their immediate material and social environment, the intersection of distributed cognition with extended mind is substantial” (Hutchins, 2014, p. 37). Given this overlap, it might seem like a good option to interpret Gallagher’s proposal as encompassing both extended and distributed elements – where the latter can be used to ward off problems with cognitive bloat and the delineation of cognitive systems.

However, there is one problem: Combining extended and distributed cognition means adopting a distributed perspective on cognitive systems that consists of human beings being coupled with external items, physical or social. Viewing a system from a distributed perspective “implies that wherever we find cognition, it will be possible to investigate how a process we call cognitive emerges from the interactions among elements in some system”
(Hutchins, 2014, p. 36). Thus, from a distributed perspective on an extended cognitive system, the question is what contributions a human being makes to the larger system as a whole. Gallagher’s question (and the question with which we began this paper) is the exact reverse: It is the question of what social institutions contribute to our cognitive processes and abilities. This is clear from later passages in Gallagher’s work, which follow those that illustrate congeniality between socially extended and distributed cognition. The passage on contracts continues as follows:

Contracts are institutions that embody conceptual schemas that, in turn, contribute to and shape our cognitive processes. They are not only the product of certain cognitive exercises, but are also used as tools to accomplish certain aims, to reinforce certain behaviors, and to solve certain problems. (Gallagher, 2013, p. 6).

The passage on reaching a legal judgment is followed by this remark:

Socially established institutions sometimes constitute, sometimes facilitate, and sometimes impede, but in each case enable and shape our cognitive interactions with other people. Such institutions allow us to engage in cognitive activities that we are unable to do purely in the head, or even in many heads. (Gallagher, 2013, p. 7)

These two questions – “What does an individual contribute to the larger social system she is a part of?” and “What does a larger social system contribute to the cognition of an individual who is a part of that system?” – are obviously connected. Their answers are codependent. And yet they are different questions which serve different research interests. To ask how social institutions change, enable, and constitute our cognitive abilities is to take an “inside” perspective on distributed systems. It is to look at social institutions from the perspective of individuals who are their constituents and their users. This is the typical centered perspective that is also characteristic of the extended cognition approach and which may have made the extended cognition framework the natural choice for Gallagher. It is crucial, however, that in order to determine how a legal system allows one to sign a contract or how a system of conventions allows one to be polite in a given situation, we need to look at how one’s behavior has become attuned in specific ways to existing practices. Typically, this does not involve the whole legal system or the entire system of conventions. One need not know all the ins and outs of a legal system in order to sign contracts, and one can be polite in one’s actions in one situation without being aware that similar behavior in another situation counts as impolite. In other words, we usually need not look at a social institution as a whole, in all its details, in order to see how it constitutes one’s cognitive processes and abilities, but only at those aspects that are pertinent to one’s role in and use of that institution.

The distributed cognition approach, by contrast, views the overall social institution from a “zoomed-out,” external point of view in order to be able to
determine how all the elements within it interact so as to constitute the larger system. For such an approach, it would not do to focus merely on those aspects that determine the behavior of one or a few of its constitutive elements. However, in order to determine how the elements of a cognitive system hang together from a distributed point of view, it is impossible and usually not necessary to look at the specific ways in which each of these elements operates and is connected to and determined by the components in their direct vicinity. To use Hutchins’ examples, we can determine how visual modules in the brain interact so as to enable depth-vision without looking at the cellular or biochemical level of interaction between them, and we can model the emergence of language in a group without modeling the specific interactions between individuals.

Thus, approaching cognition in social institutions from a centered or from a distributed perspective leads to different questions that serve different research interests. This makes it hard to interpret Gallagher’s proposal as a version of distributed cognition. However, now we have a predicament: The intuitive problems that socially extended cognition is faced with (Section 3) can be avoided by interpreting it as a form of distributed cognition (Section 4), but that interpretation is incompatible with the centered nature of the question that sets the agenda for Gallagher and for this paper.

6. Varieties of scaffolded cognition

The way out of this predicament is to see that there is an alternative for both distributed and extended cognition that fits the centered research interests of Gallagher and explains how social institutions constitute cognitive processes and abilities, but does so in a way that is more akin to distributed cognition. To identify this option, we need to make a simple taxonomy of different ways in which cognition can be scaffolded by external items, physical or social. The basis for this is a distinction between two dimensions of the interaction between elements in a system from which cognition – or a ‘cultural ecosystem of cognition’ such as a social institution – arises. I will call these dimensions functional integration and task-dependency, but not much depends on these labels. For the sake of brevity, the discussion of this taxonomy will be sketchy, but this is enough for the overall argument of this paper.

Functional integration is the extent to which the execution of tasks involves coupling with items external to the brain and body. This coupling might take many different forms and can involve different mechanisms. Heersmink (2015) provides a detailed overview of the different dimensions involved in cognition-constitutive coupling between humans and artifacts (he mentions information flow, reliability, durability, trust, procedural transparency, individualization, and transformation as dimensions of...
functional coupling). We might envisage a similar list for social coupling. Lyre (2018), for instance, mentions all forms of social cognition as possible candidates and gives a detailed account of joint intentionality as one such mechanism. For our purposes, it is not necessary to taxonomize the mechanisms behind and conditions for coupling, either with artifacts or with humans; it is enough to stress that functional integration is a causal notion. High functional integration means that items external to the brain and body are so tightly and reliably coupled that they can be considered constitutive elements of cognitive processing. Low functional integration means that items that are external to the brain and body are less tightly coupled and should hence be regarded as enabling or enhancing conditions for these cognitive processes.\(^5\)

Task-dependency is the extent to which the intelligibility of a task depends on a larger whole of coordinated tasks. Task-dependency is a notion that is connected with coordination and planning. It is a normative notion in the sense that high task-dependency means that tasks play specific roles in the overall organization of a cognitive system or a cultural cognitive ecosystem – roles that can be played properly or improperly. A legal system, for example, has a high degree of task-dependency: The tasks of judges, barristers, clerks, prosecutors, and other officials are holistically inter-defined such that we can only explain what a barrister does, for instance, by referring to the roles of judges and prosecutors. The same goes for a system of cultural conventions, where various protocols inter-define the roles of participants, or for a system of traffic regulations. While task-dependency is perhaps most easily recognizable in social-cognitive systems, it can also be discerned at “lower” levels of organization. In Hutchins’ example of the interplay of visual modules in the brain, for instance, each module plays a certain role in the overall system that realizes stereo vision, such that the role of each module is co-defined by the roles played by the other modules. The normativity, in this case, is not social but derived from, for example, the “proper function” (Millikan, 1984) of these modules, which is determined by the evolutionary heritage of the cognitive system they are a part of.

Both functional integration and task-dependency come in degrees. For our purposes, we can simply distinguish between high and low task-dependency and high and low functional integration, ignoring the gray areas in between for the sake of the argument. Likewise, I will merely appeal to intuition, elicited by the standard examples of the debate, to distinguish between high versus low functional integration or task-dependency. We can use the two dimensions to make a matrix (see Figure 1) that provides us with a simple taxonomy of four variations of scaffolded cognition, three of which have the familiar labels of ‘embedded,’ ‘extended,’ and ‘distributed’ cognition. I will label the fourth *symbiotic cognition*. 
My main claim in the remainder of this paper is that social institutions constitute cognitive processes and abilities through task-dependency, more so than through functional integration. I will argue that characterizing cognition that is constituted by social institutions as *symbiotic* rather than distributed or extended cognition is more true to the nature of institutions and avoids the predicament of the previous section. First, however, I will briefly elaborate on the four variations of scaffolded cognition, going clockwise starting from the top-left corner of the matrix.

Cognition that is aided, enabled, or enhanced but not constituted by interaction with artifacts and other people is known as embedded cognition. A typical example is following the signs to a gate at the airport. In such a case, functional integration is arguably low – I am not continuously in causal contact with signs, but I occasionally look for one when there is a junction or when I lose my bearings. Likewise, there is no real task-dependency. My activity – finding the right gate for my flight – is intelligible without the signs, even though their absence would make my task considerably more difficult. Embedded cognition does not play a big role in the discussion that follows. Huebner (2013) argues that cognition that is scaffolded by social institutions is typically embedded cognition. I will argue below that this is wrong.

Extended cognition is characterized by high functional integration. Clark and Chalmer’s famous example of Otto, whose memory relies on a notebook, is a case in point, and so is the example of the physicist Feinman’s use of pen and paper for making complex calculations that cannot be done in the head. In these cases, the causal coupling is frequent (in Otto’s case) or virtually constant (in Feinman’s case), highly reliable, and absolutely necessary to carry out the task. Because of this tight causal coupling, extended cognition theorists argue that the pen and the notebook are constitutive parts of the cognitive processes of remembering and calculating. And yet, however constitutive these items are for these processes, the
tasks of remembering or calculating are themselves intelligible in abstraction from tasks carried out by other people. To use the terminology of the matrix, there is low task-dependency.

Like extended cognition, the standard examples of distributed cognition are characterized by high functional integration. The team of sailors navigating a marine vessel or the team of pilots collaborating in the cockpit of an airliner are clear examples. The pilots and the sailors are coupled with elaborate equipment, and Hutchins’ point is precisely that the high functional integration of pilots or sailors with their instruments and machines is what allows us to view these larger systems as cognitive systems in their own right. Unlike extended cognition, though, distributed cognition is also characterized by high task-dependency. The roles of each of the pilots in the airliner and the roles of the sailors navigating the marine vessel are holistically inter-defined. That is, the tasks of each of these people are unintelligible or seemingly pointless in abstraction from the tasks and roles of others in the same system.\(^6\)

The last square of the matrix stands for cognition that is characterized by the same kind of high-task-dependency that is distinctive of distributed cognition and the same kind of low functional integration that is characteristic of embedded cognition. Cognition that is scaffolded by social institutions fits this profile. As explained above, social institutions such as legal systems, educational systems, and systems of cultural conventions typically involve a very high degree of holistic inter-defining of roles and tasks. The tasks of judges, barristers, clerks, prosecutors, and so on are inter-defined, as are the roles of teacher, head of school, and pupil, and the roles of host, guest, and waiter. This is completely in line with Gallagher and probably not controversial.

What about low functional integration? This might seem less uncontroversial. Gallagher (2013, p. 6) writes that social institutions must be “activated” to act as mental institutions by “enactive coupling.” Thus, when writing about an individual who has to make a judgment about the legitimacy of certain arrangements, for instance, he claims that this individual “interacts with the legal system and forms a coupled system in a way that allows new cognitive processes to emerge” (2013, p. 7). This suggests that Gallagher sees high functional integration as a key feature of cognition in social institutions. Still, this is too quick. What, exactly, does the causal coupling of an individual with a legal system consist of? How does one couple with a whole system? If we think of the person making the judgment of legitimacy, it is certainly true that her thinking is constrained and constituted by the legal system she is a part of. But if we think of how the legal system does this, it would be plain wrong to say that she can make this judgment only because she is causally connected to the system in the right way at the moment of making the judgment. This would
ignore the relevance of this person’s *history* with the system and ignore the possibility that she makes the judgment while on vacation in a distant country.

This conclusion may be premature, however. Why would there be a sharp contrast between a person’s history with the system and casual coupling with the system? After all, the person’s history with the system consists of causal interactions between the person and the system. Can we not regard that history as a form of distal causal coupling? I think not. Rather, I think that the term ‘coupling’ is wrong. The causal interactions between a person and a social institution which have made her a part of that institution, a user of that institution, or both are not specific triggers for a person’s actions. Rather, they are the structuring causes that have set the person up to become sensitive and responsive to specific institution-related triggers (the distinction between triggering and structuring causes is taken from Drestke, 1988). Such setting up is certainly a causal process, but it is the kind of process that puts in place the way in which a person is coupled with a system, rather than being part of that coupling.7

In fact, Gallagher’s references to causal coupling are sparse. Most of his characterizations of cognition in social-institutional contexts are cast in terms that can be translated into what I have labeled task-dependency: that cognitive processes such as making a judgment about the legitimacy of certain arrangements are intelligible *only* within the larger framework of an institution within which other people have specific roles, tasks, and responsibilities. This characterization of cognition in an institutional context is then erroneously cast in terms of causal coupling (but only a few times) because task-dependency and functional integration are mistakenly conflated.

The extended cognition framework might seem like the right fit for cognition within social-institutions if we conflate task-dependency and functional integration. However, this leads to the problems of Section 3, and it seems wrong-headed anyway. The extent to which cognition within legal systems, systems of conventions, and educational systems is characterized by functional integration – that is, by causal coupling with other people and artifacts – is often considerably less than in the examples of distributed cognition. For instance, I spend my time working in the educational system of a university. That *does* involve functional integration – I need to interact with colleagues, students, computers, libraries, and so on. However, I can also function in that institution for days on end working at home, interacting mostly with my laptop. This is quite different from an airplane pilot or marine vessel navigator who cannot perform their functions without being in frequent contact with others and in almost continuous contact with equipment.
In order to defend and elaborate on the distinction between cognition in groups with high functional integration and in those with low functional integration, it is useful to have a label for the latter. Let us call cognition that falls in the bottom-left square of the matrix symbiotic cognition. I am using the term ‘symbiosis’ here as it is used in non-biological parlance. It is the idea that the cognition of two or more people is codependent to their mutual benefit – one individual’s task would be pointless and senseless without other people performing their respective tasks.¹⁸

I want to argue that symbiotic cognition, unlike distributed cognition, invites a centered perspective on cognition. This is not obvious. The distinction between symbiotic cognition and distributed cognition is seemingly gradual. Yet, the difference between a distributed perspective on a “group mind” and a centered perspective on cognition in social institutions is binary. The point is that there is a more principled distinction between symbiotic and distributed systems that corresponds with low and high functional integration. This distinction pertains to the purposes or aims of distributed cognitive systems and symbiotic cognitive systems. The purpose or aim of a distributed cognitive system is pitched at the supra-personal, systemic level of description. That is, the purpose that is served by the system should not be sought at the level of the individuals that co-compose the system, but at the more “zoomed out” level at which the system as a whole can function as something like an agent or cognizer. For example, the system comprised of pilots and cockpit equipment as a whole has the purpose of controlling an airplane, more or less like a mind controls a body. The purpose or aim of a “transactional memory system” consisting of a married couple consists in storing and retrieving memories together, more or less as is done by an individual. By contrast, if we look at symbiotic cognitive systems, their purposes are pitched at the sub-systemic, personal level. Educational systems educate individual persons. Legal systems and cultural conventions allow individuals to coordinate in various complex ways. The purpose that is served by symbiotic systems should be sought at the level of the individuals that co-compose them.⁹

From this point of view, it is natural to ask what supra-personal cognitive systems do for people in the case of symbiotic systems and what people do for supra-personal systems in the case of distributed systems. That is, it is fitting to adopt a centered perspective for cases of symbiotic cognition but not for cases of distributed cognition. This does not mean that it is impossible or useless to adopt a distributed perspective on symbiotic cognition or a centered perspective on distributed cognition. Let me discuss both possibilities in order to explain what it means to say that it is “fitting” to adopt a centered perspective on cognition in social institutions and a distributed perspective on group mind systems.
Adopting a distributed perspective on, say, an educational system is perfectly possible. Doing so would require us to spell out a purpose of the system at the supra-personal system level – for instance, in Durkheimian functionalist terms. The point is that it would be contrived to call such a function ‘cognitive’ because it does not resemble any paradigmatic cognitive function. This is quite unlike the case of distributed cognitive systems: Controlling an airplane is sufficiently like controlling a body to count as cognitive, and storing and remembering events together is sufficiently like storing and remembering events alone to count as cognitive. A distributed perspective on a symbiotic system, by contrast, is not a perspective on a cognitive system but a perspective on a system that shapes and enables cognitive processes – processes which are discernible from a centered perspective.

Conversely, it is perfectly possible to adopt a centered perspective on the persons operating in a distributed cognitive system. However, here the “problem” is exactly the opposite: We can only make sense of what a single pilot is doing if we view his actions as a component of a larger system that also includes elaborate equipment and a second pilot. There is no natural sub-systemic, personal-level purpose we can ascribe to the activities of a single pilot. Thus, the operations of a single pilot are better described as part of a cognitive system.

Thus, unlike distributed cognition, symbiotic cognition invites a centered perspective. This gives us an opening to dissolve the predicament of Section 5; here we have a perspective on cognition that is sufficiently different from extended cognition and sufficiently similar to distributed cognition to avoid the problems of Section 3. Nothing in the idea that task-dependency constitutes cognitive processes and abilities suggests that a social institution is a part of our minds in the causal-coupling sense which leads to the problem of cognitive bloat. Moreover, as long as the vagueness of the boundaries of a system is no impediment for inter-defining roles and tasks, this is not a problem for our position either. Furthermore, this position is also sufficiently different from distributed cognition to allow for, and even invite, a centered perspective on cognition. Thus, it seems that we have a potential variety of scaffolded cognition that can solve Gallagher’s predicament; one that has gone unnoticed because task-dependency and functional integration have not been properly distinguished.

Whether symbiotic cognition can indeed provide a solution to the dilemma of Section 5 depends on whether it can function as a proper alternative for the idea of socially extended cognition. In the next section, I will explain that it can.
7. Symbiotic cognition

Gallagher’s characterization of cognition in social institutions as socially extended cognition incorporates two important claims: (1) Social institutions co-constitute cognitive processes and abilities, (2) cognition that is co-constituted by social institutions allows for a substantial amount of cognitive offloading. This means that the notion of ‘symbiotic cognition’ can only be a good replacement for ‘socially extended cognition’ if it incorporates similar claims. In this last section, I claim that it does.

Symbiotic cognition provides a different picture of how social institutions constitute cognitive processes and abilities than does extended cognition. As mentioned briefly in Section 2, in the extended cognition framework “P is a constitutive element [of X] if P is part of the processes that produce X” (De Jaegher et al., 2010, p. 443). The idea here is that “the set of all the constitutive elements is the phenomenon itself.” This can be unpacked in different ways. Constitution on an enactive view of cognition (Kirchhoff, 2015) is different from constitution on a functionalism-oriented, mechanistic view of cognition (Bechtel, 2008; Craver, 2007), but in each of these, the constitutive elements of a cognitive process coincide temporally with the occurrence of the cognitive process. This is a perfectly legitimate notion of constitution that fits well with the dimension of functional integration: the elements that a person is causally coupled with constitute cognitive processes during their execution.

The concept of ‘task-dependency’ provides a different way of understanding how social institutions are constitutive of cognitive processes and abilities. If cognitive abilities and processes are inconceivable from a perspective outside of a symbiotic system such as a social institution, if they can only exist as a result of the fact that an individual is part of such a system, then this is a form of constitution too. The social institution creates and constitutes these abilities and processes. Being polite at a reception, addressing an official with her appropriate title, knowing the difference between using coarse language in a group of friends and to a stranger who offended you, signing a contract, fumbling for change to get a shopping cart at the supermarket, and so on – these are activities that are impossible and inconceivable in abstraction from their respective socio-cultural institutions. They have no analogues in a world that is non-enculturated.

We can square this type of constitution with De Jaegher et al.’s characterization of constitution by allowing for a different reading of ‘the process of production.’ ‘The process of production’ need not only refer to the processes that coincide with the execution of a given cognitive process. It can refer just as well to practices of socialization and training that provide one with the capacity to execute that cognitive process. One’s ability to use cultural conventions and norms is acquired in the course of one’s upbringing.
A judge’s capacity to rule in court cases is acquired with training in law school, practice as a lawyer, and further training. Socialization, training, education, and enculturation are processes in which individuals become attuned to symbiotic cognitive systems such as social institutions. Through such processes, social institutions constitute the symbiotic cognitive capacities of individuals. Though this is not the type of constitution at play in extended cognition, it is also not the type of scaffolding involved in embedded cognition, precisely because, unlike in the case of embedded cognition, social institutions constitute cognitive tasks by creating them.

Just like the type of constitution at play in symbiotic cognition is different from the type of constitution at play in extended cognition, there is a difference between the type of cognitive offloading involved in extended cognition and that involved in symbiotic cognition. Daniel Dennett describes cognitive offloading as “enhancing, streamlining and/or protecting our cognitive processes by means of various kinds of external devices” (Dennett, 1996, pp. 134–135). This description suggests a comparison between a cognitive process that is performed with and without external devices, where the latter is supposed to proceed with less effort, in an enhanced way, or both. In other words, the cognitive process itself is supposed to be intelligible in abstraction from its scaffolding. This is the type of offloading that is typically at play in extended cognition.

Gallagher gives the following example of cognitive offloading, which initially seems to follow this template. In this example, Judge Alexis has to make a judgment in three different situations:

1. In the first scenario she is asked to make her judgment on the basis of her own subjective sense of fairness, weighing the evidence entirely in her own head.
2. In the second scenario experts specify the kind of questions or considerations she can address.
3. In the third scenario experts further provide possible answers and a set of rules to follow in making her decision. (Gallagher, 2013, p. 6)

The obvious point here is that in the second scenario, Alexis can offload some of the cognition she needs in Scenario 1, and in Scenario 3, she offloads some of the cognition she needs in Scenario 2. This seems like typical extended-mind-style offloading.

However, Gallagher continues to argue, importantly, that “it is clear that cognition is socially extended across the legal institutional practices in all the scenarios, since even in (1) Alexis is presented the evidence and given a predetermined task. She does not think these up on her own” (Gallagher, 2013, p. 6–7). Setting aside the terminological issues with the label ‘socially extended,’ one important point here is that in all three
scenarios, Alexis’ functioning is intelligible only in the context of the legal system that determines and defines her task as judge, relative to the tasks of others. What counts as evidence and how it should be weighed against other considerations, what sentences she should choose from, the meaning of notions like ‘fairness’ and ‘proportionality,’ and so on are intelligible only from within the system.

Here something more than extended-mind-style offloading seems to be at play, for here an individual does not benefit from external items (i.e., a social institution) because they do some of the work that she used to do. Rather, an individual benefits from them because they allow her to be engaged in new cognitive activities. In order to see how this amounts to offloading, we need to look at how an individual like Alexis benefits from such newly acquired cognitive abilities. For that, we need to look at the function of the symbiotic system as a whole. The legal system as a whole, for example, serves the society of which Alexis is a part. It does so by dividing and defining labor into smaller, carefully interconnected, complementary parts. One such part is the role of a judge. Division of labor involves a specific type of offloading, one which is typical for symbiotic cognition but not for extended cognition. Every participant in a symbiotic system profits from whatever the system as a whole offers (e.g., education, justice, social coordination), while contributing only a small part. The tasks, jobs, and roles of others in the system co-define and enable one’s own task, but one does not have to perform them or even think about them, while nevertheless benefitting from the overall outcome of the system. This is cognitive offloading too, as low-effort input produces high-gain output through scaffolding.

It is worth emphasizing that the low effort versus high gain difference is not only the result of the division of holistically inter-defined labor. In many symbiotic cognitive systems, the coordination of interconnected roles and tasks is facilitated by a physical infrastructure and specific physical artifacts. There would be no legal system without courtrooms, offices for barristers, physical law books and all kinds of paraphernalia, such as gowns, hammers, and, in some countries, wigs. There would be no educational system without school buildings, blackboards, pens and paper, computers, and so on. Without these physical items, the specific interactions between people that are characteristic of legal and educational systems cannot take place. While many of these physical artifacts extend the minds of individuals, it would be too much to say that the mind of an individual teacher, for example, is extended by the whole infrastructure that is involved in an educational system.

But it would not be incorrect to say that such an infrastructure extends and co-constitutes a symbiotic system such as an educational system.

Thus, the notion of symbiotic cognition explains how social institutions constitute cognitive abilities and processes and how they allow for cognitive
offloading. In this respect, symbiotic cognition shares the essential features of socially extended cognition. However, both the constitution of cognition and cognitive offloading are of a different character than constitution and offloading according to the extended cognition framework. This is exactly why the symbiotic cognition framework can paint a more realistic picture than the extended cognition framework – a picture that avoids the pitfalls of Section 3.

8. Summary and conclusion

In this paper I have argued for the following claims:

(1) The idea that cognition in the context of social institutions should be characterized as socially extended cognition runs into problems of cognitive bloat and delineation of cognitive systems.

(2) Adopting the perspective of distributed cognition does not help because even though this perspective avoids these problems, it is incompatible with the centered research question of characterizing the cognitive processes and abilities of individuals in social institutions.

(3) The ensuing predicament is the result of conflating two dimensions of the interactions between elements of cognitive systems: functional integration and task-dependency. Unlike extended and distributed cognition, social institutions involve a type of cognition that is characterized by low functional integration and high task-dependency, which I have labeled ‘symbiotic cognition.’

(4) Like socially extended cognition, symbiotic cognition allows for a centered perspective on cognition, it explains how social institutions constitute cognitive abilities and processes, and it explains how social institutions allow for cognitive offloading. Like distributed cognition, though, symbiotic cognition does not fall prey to the problems of cognitive bloat and delineation of cognitive systems.

Notes

1. In the context of this paper, ‘socially extended cognition’ refers specifically to the idea that cognition is constituted by social institutions. Other, usually more liberal, uses of the terms exist in the literature.

2. This is not to say that complementing brain-based cognition automatically turns external items into co-constituents of cognitive systems. For an extensive overview of the further conditions that need to be met for this to be the case, see Heersmink (2015).

3. This might be read as a lack or metaphysical commitment about the nature (brain-bound or not) of cognition (Hutto, Kirchoff, & Myin, 2014, p. 4). However, as Sutton
emphasizes, “theorists of distributed cognition do (rightly) focus on encouraging methodological and pragmatic change to scientific practice, and tend to see metaphysical claims about the general nature of mind as having to arise from scientific work” (Sutton, 2014, p. 429). Hutchins (1995, Chapter 9) is clear about the fact that cognitive science should be re-designed to include collective cognitive systems.

4. I am using ‘scaffolding’ as a neutral, cover-all term that encompasses various ways in which items external to the brain and body enable, enhance, and/or constitute cognitive processing. See Sterelny (2010) for a similar use of the term.

5. A terminological note: ‘functional integration’ might evoke associations with functionalism. Gallagher explicitly rejects a functionalist perspective on extended cognition. However, for one thing, the obvious alternative label ‘cognitive integration’ is already taken. Menary’s (2007, 2010) notion of ‘cognitive integration’ differs from the notion of functional integration intended here, precisely because it takes a more distributed and less centered perspective on cognition. Hence, Menary is not in favor of the centered idea that social institutions constitute a person’s cognitive processes. According to him, they are enabling background conditions. Furthermore, I will claim in the next section that social institutions constitute cognition in a way that is not based primarily on functional integration. This would fit Gallagher’s proposal better because it solves the dilemma of Section 5. Hence, even if functionalist associations remain, there is no harm done.

6. Hutchins emphasizes that distributed cognition is a perspective on cognition and not a kind of cognition. Cognition that is characterized by high functional integration and high task-dependency sounds like a kind of cognition. For now, I will bracket this problem. Below, I will discuss how the difference between the lower two squares of the matrix hinges mostly on perspective-taking.

7. Thanks to an anonymous reviewer for raising this issue. Thanks to Frank van Caspel for suggesting the relevance of the distinction between structuring and triggering causes.

8. In biology, this is known as mutualistic symbiosis, which is to be distinguished from commensalistic or parasitic symbiosis. An example of mutualism is the relationship between clownfish and certain types of sea anemones. The territorial fish protects the anemone from anemone-eating fish. The stinging tentacles of the anemone in turn protect the clownfish from predators, while a special mucus on their skin protects the fish against the tentacles’ stings.

9. The connection between high functional integration and a system-level purpose is intuitively plausible. High functional integration makes it easier to regard a system as a single ‘agent’ or ‘cognizer.’ However, more conceptual research is required to explain this connection, for the fact remains that the level of functional integration seems to be a gradual notion. We cannot exclude the possibility of less functionally integrated systems that have a system-level purpose (see, e.g., Perry, 2010), which would warrant a fifth category of cognition.

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