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COMMUNICATION AND INQUIRY:

John Dewey on the Role of Language In Intelligence

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ABSTRACT

In this thesis I examine John Dewey's discussion of the natural bases of inquiry—his attempt to show how intelligent behaviour is continuous with, and a special case of, organic behaviour more generally conceived. I argue that as "the tool of tools", he takes language to be a crucial element in intelligence as it enables an organism to exert control over the formation of its habits through inquiry (EN: 134). For behaviour to be intelligent, he thinks, not only requires an organism to exert control over its habit formation but also requires that an organism exercise control over its behaviour using the best means available. The scientific method of forming beliefs, he claims, provides the best available basis for intelligent action. It is for this reason that Dewey takes scientific inquiries, in particular, to be exemplary of inquiry and why he identifies the scientific method as method of intelligence.

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INTRODUCTION

The notion of intelligence is central to John Dewey's thought. It is crucial to his account of democratic institutions and his philosophy of education. He also takes the role of intelligence in experience to be one of the fundamental and recurring problems of epistemology and, in his account of science, argues that "scientific methods simply exhibit free intelligence operating in the best manner available at a given time" (LTI: 527). In this thesis I argue that Dewey's philosophy of language plays a central role in his understanding of intelligence.

Although the notion of intelligence plays such an important role in Dewey's thought, his discussions of it are more suggestive than definitive. However, he is most explicit in his position that intelligence is primarily a property of behaviour. Dewey takes 'intelligence', the noun, to be derived from the adjective 'intelligent'. To say that an organism possesses intelligence, for him, is to say nothing more than that it is capable of behaving intelligently. Dewey's emphasis on the importance of behaviour in intelligence is perhaps most clear when he says that "intelligence means operations actually performed in the modification of conditions, including all guidance that is given by means of ideas, both direct and symbolic" (QC: 160). Intelligence not only involves overt action: in order for behaviour to qualify as intelligent it must also involve the deliberate change of physical or cultural conditions in a way that is guided by knowledge. This is to say that intelligent behaviour is carried out on the basis of beliefs that have been warranted through systematic experiment and development.

Given his claim that the method of science is the clearest and best example of

the method of intelligence, it is clear that his discussion of scientific inquiry, in particular, is important for getting clear on what he takes to be involved in intelligent behaviour. Science, Dewey claims, is not only the best means available for developing knowledge, but it also provides the grounds for intelligent action. He says, "the perfecting of method[s], the perfecting of intelligence, is the thing of supreme value" because through the development of adequate methods for forming beliefs we simultaneously develop the grounds for intelligent action (QC: 160).

Above all else, for Dewey the experimental method of science is the best means available for humans to play an active role in forming their own habits.[1] While he sees the aim of scientific inquiries to be the pursuit of truth, he thinks that the method of science is a case of behaviour in which habits, which he understands as patterns of behaviour or dispositions, are most systematically and deliberately subject to scrutiny. The method of investigation found in the sciences is, he thinks, the best means available for modifying one's behaviour. Although the exercise of control over how one's behaviour is formed is not sufficient for behaviour to be intelligent, Dewey identifies such control to be a necessary factor. And while scientific inquiries are not exhaustive of intelligent behaviour (or even of inquiries) Dewey takes the practice of science to be exemplary of the method of intelligent action because it is what he considers to be a behaviour in which the control exercised over an organism's own habits is most reflective and systematic.

In the first part of *Logic: The Theory of Inquiry* Dewey lays out what he calls the "Existential Matrix of Inquiry." The purpose of this discussion is to show how "rational operations [i.e. intelligent behaviour] *grow out* of organic activities, without

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[1] See Larry Hickman's discussion in "Beyond the Epistemology Industry: Dewey's Theory of Inquiry" In Pragmatism as Post-Postmodernism: Lessons from John Dewey. (2007).

being identical with that from which they emerge" (26). Although the mention of growth might suggest that Dewey is interested in offering an evolutionary account of how intelligent species developed from unintelligent species, this is not his project. In discussing the "Existential Matrix of Inquiry" his purpose is rather to develop the claim that biological and, in particular, cultural factors play a necessary and important role in inquiry as well as in intelligent behaviour more generally. In these chapters he also argues that the use of language, in particular, is a necessary condition for habits of inquiry. In my thesis I explore this argument in order to provide an understanding of the role that language plays in Dewey's account of intelligence.

As a work of commentary on John Dewey's thought, this thesis will help remedy the dearth of material regarding his account of language. While this work is not alone in taking up this subject matter, as Paul Weinpahl (1967) and Max Black (1962) have each contended with this topic, to the best of the author's knowledge this thesis is unique in taking seriously Dewey's discussion of language in its widest sense. For example, when discussing Dewey's account of language, Max Black states that, "all that we have so far found him to be saying [about language] would apply equally well to any kind of cooperation or concerted activity, whether involving the use of words or not" (515). He rightfully complains that Dewey's account of language and meaning fails to differentiate between the meaning of words, the meaning of sentences, and even the meaning of objects. This characteristic of Dewey's theory is intentional, however, and Max Black errs in taking Dewey to provide an account of speech. Dewey's is explicit that his account of language and meaning is meant to discuss these topics in their widest senses. His account is intended to illustrate how we can understand the behaviour of speech in terms of the behaviour of tool-use more generally. I argue that it is in this wide sense that Dewey

identifies language to be necessary for intelligent behaviour. The present work is not only unique in attempting to place Dewey's discussion of language with respect to his accounts of inquiry and intelligence.

In the first chapter, "Language, Communication, and Symbols", I explore Dewey's argument that language is necessary for habits of inquiry. He takes language to play a crucial role in intelligent behaviour when he says that "the development of language (in its widest sense) out of prior biological activities is, in connection with wider cultural forces, the key" to the transformation of organic behaviour into behaviour that is distinctively intelligent (49-50). I will explore Dewey's argument for this claim and argue that at the core of his account of the importance of language for intelligence is his discussion of the use of symbols in its widest sense. In particular, he argues that by using symbols, which includes words as well as meaningful objects such as technological artifacts, an organism is able to exert control over its behaviour. After elaborating Dewey's conception of language in terms of symbol use, I will use his discussion of controlled inference in exploring his view of the impact of symbol use on behaviour. While he thinks that even non-linguistic organisms engage in inference, he insists that control over habits of inference is only possible through the use of symbols. Because Dewey sees inquiry as the art of controlled inference, I argue that language is necessary for the behaviour of inquiry.

In my second chapter, "Symbols and Inquiry", I continue my discussion of Dewey's account of symbols by exploring their role in his theory of inquiry. I will argue that, according to him, what makes an inquiry scientific is the way it employs symbols and develops the meaning of objects. After detailing his account of the pattern of inquiry—a pattern which he takes to be shared between science and

common sense—I will argue that what sets inquiries that are distinctively scientific apart from common sense is that the meanings used in scientific inquiry are systematically and experimentally developed in a way that avoids reference to particular purposes. In showing how, on his view, inquiry involves the deliberate development of meaning—ways of using and interpreting both words as well as technological artifacts—I will show how inquiry is a case of intelligent behaviour for Dewey. By showing the integral role that language, as Dewey understands it, plays in his account of scientific inquiry, I provide the background necessary for understanding his account of the role of language in intelligent behaviour.

In chapter three, "Science and Intelligence", I explore Dewey's discussion of scientific inquiry as the method of intelligence. Intelligent action, for Dewey, is carried out on the basis of systematically tested ideas, and therefore requires an organism be able to exert deliberate control over the formation of its beliefs and habits using the best means available. As he contrasts intelligent behaviour with behaviour that is routine, I explore what is involved in Dewey's claims that the scientific method represents the best means available for forming and scrutinizing beliefs and habits. I will conclude by contrasting my understanding of Dewey with that of Richard Rorty. Rorty claims that Dewey fails to acknowledge an important role for language in his account of intelligence. I will argue that the account I have sketched over the course of this thesis shows Rorty's assessment to be incorrect. Although I show that Rorty is incorrect to claim Dewey places inadequate importance upon language, I will also argue that any semblance of agreement between these two thinkers is no more than superficial. As each thinker understands 'language' differently, as well of the role of language in intelligence, I will use this contrast in order to draw attention to the uniqueness of John Dewey's position.

To summarize, Dewey's account of the natural bases of inquiry is an attempt to show how intelligent behaviour is continuous with, and a special case of, organic behaviour more generally conceived. I argue that he takes language, in its widest sense, to be of particular importance for intelligent behaviour because it enables an organism to exert control over the formation of its habits through inquiry (EN: 134). For behaviour to be intelligent, he thinks, not only requires an organism to exert control over its habit formation but also requires that an organism exercise control over its behaviour using the best means of inquiry. The scientific method of forming beliefs, he claims, provides the best available basis for intelligent action. It is for this reason that Dewey takes scientific inquiries, in particular, to be exemplary of inquiry and why he identifies that scientific method as the method of intelligence. As language—the capacity to use objects (which includes more than words) symbolically—is necessary for habits of inquiry and has a crucial role in scientific inquiries, the behaviour involved in language, as Dewey understands it, plays a central role in his account of intelligence.

CHAPTER I: LANGUAGE, COMMUNICATION, AND SYMBOLS

1. Introduction

Dewey contrasts intelligent behaviour with behaviour that is routine. Behaviour that is performed solely on the basis of routine is carried out without the foresight necessary for intelligent action in the face of new situations. For most organisms, habits are formed unconsciously through interactions with their physical environment, e.g. hunting, eating, or securing shelter. However, Dewey thinks that through communication the possibility is opened up for organisms to play an active role in the formation of their beliefs and behaviour. He says, "apart from communication habit-forming wears grooves; behaviour is confined to channels established by prior behaviour" (EN: 214). A cat that runs to the kitchen upon hearing a can-opener does so because of its past experience getting food in such circumstances. The history of success lays the basis for an expectation of food, and this expectation lays the basis for the cat's subsequent behaviour, such that even when not hungry the can opener evokes an anticipation of food.

While the habits of many organisms largely function only under the particular circumstances that first gave rise to them, e.g. the sound of the can opener, Dewey claims that communication makes it possible for an organism to anticipate potential applications and new uses for its previously formed behaviours when encountering unprecedented situations. More importantly, he also thinks that communication introduces the possibility for an organism to deliberately search for new avenues of behaviour. This search sometimes takes the form of inquiry and, as I will argue in later chapters, the behaviour of inquiry is central to his account of intelligence.

Dewey takes the impact of communication upon behaviour to be greatest in the case of inference. While he says that there is a sense in which even nonlinguistic organisms engage in inference, he maintains that the development of language, habits of using meaningful objects (which includes more than just words), makes it possible for 'higher' organisms to refine and develop their habits of inference. "Without [symbols]" in this broad sense, he says, "no intellectual advance is possible; with them, there is no limit set to intellectual development except inherent stupidity" (QC: 121). In this chapter I explore his claim that language and communication are necessary for the intelligent control of behaviour by explicating his argument that language is necessary for controlled habits of inference.

Dewey understands language in its widest sense with the use of symbols. When an organism's behaviour is represented in a system of symbols, its habits come to be interconnected in this medium. The articulation of habits by means of symbols, he claims, enables the relations that habits bear to one another to become subject to deliberate scrutiny, making possible the deliberate search for new and fruitful ways of acting. I will first examine Dewey's account of language as the use of symbols, as this understanding forms the basis of his view that language is a necessary factor in intelligence. I will then elaborate his account of the impact of symbols upon habits of inference. While he defines inference in terms of the use of signs, the development of the relations that symbols bear to one another are required for the control of habits of inference. I will therefore begin my discussion of inference with Dewey's distinction between symbols and natural signs. After exploring his account of the role of symbols in controlled inference, I will briefly touch on the relevance of this account to Dewey's theory of inquiry. Through discussing the role that communication plays in controlled habits of inference, I will show that the behaviour involved in using

meaningful objects, for Dewey, is necessarily involved in habits of inquiry—a claim I elaborate in the next chapter.

2. Language and Symbols

In *Logic: The Theory of Inquiry*, Dewey discusses language in what he calls its widest sense, a sense that includes verbal and written communication as well as "rites, ceremonies, monuments, and the products of industrial and fine arts" (51-2). Although the inclusion of habits of using technological artifacts under the heading of language might seem to confuse very different forms of behaviour, Dewey sees an important affinity between words and technological artifacts. While language, he says, is "made up of physical existences; sounds, or marks on paper, or a temple ... these do not *operate* or function as mere physical things when they are media of communication" (52). The sounds involved in speech are physical no less than tools. The common ground between speech and the use of artifacts is that both behaviours involve the use of physical objects or events for purposes. Speech and artifacts, he says, both function as symbols and acquire meaning through their use in communication.

Although Dewey touches upon the particular role of words and speech in inquiry, this is not the topic I will pursue. My thesis will be restricted to his discussion of language in its wider sense in order to examine the connection he sees between the behaviour of symbols use (in the widest sense) and intelligent action. In discussing language in its wider sense, Dewey takes the position that it is not speech, per se, that is relevant for accounting for intelligent behaviour, but rather the behaviour involved in using objects as symbols—i.e. the use of objects in virtue of their meaning. Accordingly, when I use terms such as 'represent' and

'representation' I mean these words in a sense concordant with Dewey's discussion of language in the widest sense. In the context of my discussion, 'representation' does not necessarily refer to the representation of objects by means of words. Dewey rather reserves the term 'reference' for linguistic representation. As I will use the word, 'representation' refers to the way in which meaningful objects suggests to an organism that certain behaviours and uses are appropriate.

In "Dewey's Theory of Language and Meaning", Paul Weinpahl (1967) describes Dewey's account of meaning in terms of implicit or potential behavioural responses. As meaningful objects are those that have rules established for their use, the relevant behavioural responses to such objects are implicit in the sense that the presence of meaningful objects or events does not imply that an organism will necessarily carry out behaviour. In the sense that I will use the word, a symbol *represents* possible courses of actions in virtue of its meaning. The meaning of a symbol consists in what courses of action it represents to an organism. Because the notion of meaning is central to his notion of symbolhood, I will discuss Dewey's account of meaning in order to flesh out his account of what it involved in an object or event to function as a symbol.

On Dewey's view, meanings are "rules for using and interpreting things," where 'things' includes objects and events (EN: 141). Such rules, he takes to be primarily a property of behaviour because, as rules for the use of objects, they make reference to ways of acting—ways of interacting with objects (EN: 147). Objects, he thinks, are only meaningful insofar as habits, ways of behaving, have been established as appropriate for their use or interpretation. For example, if an organism has habits for the use of lamps, these objects come to serve a particular role in this creature's behaviour. To function *as* a lamp, and thus *be* one, an object must be put to use—it

must have a role with respect to certain purposes, e.g. as a source of illumination. If a lamp is a meaningful object for an organism, certain ways of using it have been established as appropriate. For Dewey this means that the object functions as a symbol insofar as it suggests possible courses of action or purposes that might be served through its use.

Dewey considers technological artifacts a case of language in his broad sense because they "*say* something, to those who understand them [artifacts], about operations of use and their consequences" (LTI: 52). For him, lamps 'say something' in the sense that once habits for their use have been established these objects suggest possibilities for action to those who know how to use them. Not only words, but also objects function as symbols to the extent that the latter are employed and interacted with in meaningful ways. In contrast to those who understand how to use such objects, Dewey says, "to the members of a primitive community a loom operated by steam or electricity says nothing. The electric loom is composed in a foreign language" (52). The lamp is a foreign object to such people because it is tied to purposes that are alien to the members of the community (52). It signifies nothing to such people in the way of purposeful responses. Such an object does not function as a symbol to these people as they lack the context of purposes required for interacting with this object—how to use it for achieving ends.

Dewey takes this case to be analogous to hearing a foreign word or phrase. If I do not know how to use it, a foreign word fails to convey meaning to me. It is merely a sound if I lack the appropriate context of its use. While I might know how to use the French word 'pain' under appropriate circumstances (in the presence of bread), the same might not be said for the phrase 'un ange passe.' Without an understanding of how to use the phrase, it remains meaningless for me—mere noise.

Further pressing the analogy between technology and speech, Dewey thinks that meanings in both cases are determined by virtue of their role "in and by [a] conjoint community of functional use" (LTI: 52) and claims that meanings are "the forms which things assume under the pressure and opportunity of social cooperation and exchange" (EN: 135). He does not pursue the connection between meaning and communication in much detail but rather seems to take this position for granted. Thomas Alexander (1987) provides a succinct, albeit technical, description of Dewey's theory of communication that is helpful for understanding why he takes this position. Alexander says "Meaning emerges from communication, from the effort of participants to modify and interpret a situation through a shared set of symbols in virtue of which the situation becomes common or takes on a common meaning for the participants" (182). I will attempt to unpack this definition by means of example.

If I am watching television and find that I lack a preference for any program I might pass the remote to someone else in the room. If this other person did not previously know how to use this device, they might have at least observed what purposes it served in my interaction with the television. To this extent it might become meaningful for them—they might see which of their own purposes this object might also serve. Once the remote has a meaning common between us—once we both know how to behave with respect to this object—we can use it in coordinating our behaviour. If the meaning of the remote—the behaviour involved in using this object—is shared between us, then my interlocutor and I take this object as a reference point in our respective behaviour. My handing the remote to someone would then communicate that I will accept their preferences and to that extent we come to "partak[e] in a common, inclusive, undertaking" (141). In this case I act with respect to this other person as well as an environment that I recognize to be shared.

Insofar as our environment is involved in common purposes, it has a meaning common between us.

As a further example, if I am sitting in a crowded café and notice somebody looking for a seat, I remove my articles from the seat next to mine. Although no words are exchanged, Dewey takes such situations to be exemplary of the behaviour involved in communication. I see my articles symbolically—as meaningful objects that have implications for the courses of action that are open to both others and me. The articles are meaningful as I see how they might enter into the behaviour of this other person. Seeing, on the basis of their behaviour and my experience with social customs, that this person needs a seat I anticipate their behaviour in my actions: I identify the location of my articles as a hindrance for their action and to this extent understand my items as objects shared between us. It is for this reason that Dewey describes communication as putting oneself "at the standpoint of a situation in which two parties share" (EN: 140). If unintentional, then insofar as I leave my articles in the chair I fail to acknowledge or appreciate the implications that these objects have for the actions of others. In such a case communication would surely be lacking.

It is uncertain the extent to which Dewey's analogy between tool-use and speech can be pressed. One might suggest that by including technological artifacts under the heading of linguistic behaviour will result in an inadequate account of speech. This objection is to some extent fair, as his account does not attend to the difference between the meaning of words and the meaning of sentences. However, this objection also overlooks the purpose behind Dewey's discussion. His concern is not to provide an account of the behaviour of speech, nor is his account an attempt to describe technological artifacts as a case of language in the sense of speech. His position is the inverse; when discussing language in its widest sense his claim is that

speech is a case of tool-use more generally. The reason that he uses the word 'language' to refer to this wide class of behaviour is that, no less than speech, he sees tool use to involve meaningful behaviour. He discusses language in his broad sense in an attempt to describe speech in terms of the more general behaviour of tool use. The use of words, whether for referring to objects or for coordinating action with others, might be a more complex case of tool-use on his view, but such behaviour is not a difference in kind.

3. Signs, Symbols, and Inference

Having now elaborated Dewey's discussion of language in its widest sense, I will turn to his reasons for thinking that the use of symbols—meaningful objects—is necessary for the deliberate control of behaviour. I will take Dewey's lead by approaching this topic through discussing habits of controlled inference, which he takes to be the clearest example of the impact of language—symbol use in its broadest sense—upon behaviour. While he thinks that habits of inference are often formed on the basis of nothing more than an experienced association between events, by using symbols an organism is able to deliberately investigate the efficacy and warrant of the inferences it draws, and modify these habits as required.

Dewey thinks that an inference has occurred when an organism takes an object or event as a sign of further occurrences. In fact, he goes so far as to define inference in terms of the behaviour involved in taking objects as signs. In exploring Dewey's account of inference, it will therefore be necessary to discuss his account of signs. As the purpose of this section will be to examine the role of symbols in controlled inference, I will begin by elaborating Dewey's contrast between signs and symbols.

For Dewey, the difference between signs and symbols lies in how they

function. Both, he claims, are ways in which an object represents further phenomena to an organism. He does not provide a general account of representation, but rather proceeds to describe what is involved in each case—representation by signs (which he calls significance) and representation by symbols (which he calls meaning). An object functions as a sign, he says, by virtue of "the brute structure of things," i.e. the physical connections that hold between events (LTI: 277).[2] For example, smoke can signify—serve as a natural sign of—fire to an organism because smoke is a product of combustion. In virtue of this connection the occurrence of smoke can serve as evidence of fires. By contrast, objects that serve as symbols convey certain purposes, or appropriate ways of interacting with them. The representative capacity of symbols is determined by virtue of their meanings, which have been established through communication—an account I detailed in the first section of this chapter.

For Dewey, the same object can simultaneously function as both a sign and a symbol. Smoke does not cease to signify fire when this emission is treated as a symbol—as an occurrence with meaning. However, Dewey takes one of the important differences between signs and symbols to be that while smoke bears definite relations to further events (connections which determine its potential range of significance—its capacity to function as a sign of further occurrences) as a symbol, smoke (the emission) "is liberated with respect to its representative function" (58). When taken as a symbol, smoke, the physical occurrence, is liberated in the sense that it can represent further events by virtue of more than its physical connections to subsequent events. As a meaningful occurrence we can relate the phenomenon to any number of further meanings, not simply words or concepts, but also the behaviour of

[2] Of the particular example of odour, Dewey says, "[j]ust and only because odours ... are parts of a connected world are they signs of things beyond themselves" (MW3: 117).

smoking meat or curing leather. These connections to subsequent forms of behaviour are themselves amenable to development through changes in an organism's purposes or even changes in their habits of using such objects. Having provided a preliminary characterization of Dewey's contrast between signs and symbols, I will now discuss how he sees habits of using objects symbolically to be distinct from the behaviour involved in responding to signs. I will begin with the behaviour he associates with signs—inference.

Dewey takes a beagle's behaviour when tracking a rabbit to be exemplary of behaviour involving signs. In such situations, the beagle's response is evoked by the occurrence of certain scents. Insofar as the presence of a particular scent leads the beagle to behave as if there were a rabbit present, the scent functions as a sign. The beagle pursues the scent as a sign of the rabbit's location. The scent functions as a sign for the beagle insofar as it leads the beagle to respond as if a rabbit were present. The scent is able to function as a sign of a rabbit—it signifies the creature—because it is a physical trace left by the animal.

Although Dewey does not engage the question of whether animals can make conscious inferences, it is sufficient for my discussion of the role of symbols in controlled habits of inference that the beagle responds to the scent as a sign and, at the very least, exhibits inference-like behaviour. The sense in which nonlinguistic organisms perform inferences is that they respond to some physical events as signs of other events. It is for this reason that Dewey says, "At the outset the habit that operates in an inference is purely biological" or a case of organic adaptation to their environment (LTI: 19). Such behaviour is the result of the experienced association between events and is therefore dependent upon physical conditions. Absent the scent there is no inference to the rabbit's presence available for the beagle—there is nothing

to serve as a sign, nothing to signify the presence of the rabbit. While Dewey thinks the use of objects as signs can be described in terms of an organism's behavioural adaptation to its physical environment, he thinks the same cannot be said of symbol-use. I will now turn to the behaviour he associates with symbols in order to establish what sets this behaviour apart from sign-use and use this discussion as my basis for examining why he takes language to be involved in the deliberate modification of habits of inference.

Dewey uses the example of pain when describing the behaviour he associates with the use of symbols. He says, "even the dumb pang of an ache achieves a significant existence when it can be designated and descanted upon [i.e. when it enters into communication]; it ceases to be merely oppressive and becomes important; it gains importance, because it [the pain] becomes representative" of possible courses of action (EN: 133). This quotation suffers from an unfortunate ambiguity. Although Dewey notes the act of designating the pain, it is not our word for pain that he takes as 'representative' here, but rather the pain itself. This makes it uncertain what role the use of words to designate or refer to objects is playing here. It is unclear whether our response to the pain is capable of control because of our capacity to use symbols in the wider sense as interacting with meaningful objects, or in the narrower sense of the use of words to refer to such things. If it is the former, then Dewey's account of the role of language in intelligence here slides from his discussion of language in its widest sense, to language in its more narrow sense as speech. As Dewey provides no means for resolving the ambiguity between speech and other cases of symbol use in this case, I will proceed by describing his position in terms of his broader account of language and meaning. Even if his position were that acts of designation play an important role in the control of behaviour, he would still consider this to be a case of

language in its broader sense as case of an organism using a meaningful object (in this case a word).

Although the occurrence of pain bears particular causal relations to further events (e.g. the stubbing of one's toe has a particular effect upon the biological mechanisms involved in pain), when the pain is taken to be meaningful occurrence—when rules have been established for its interpretation—the pain no longer solely bears these definite relations to further physical events as it becomes connected to meanings—other forms of behaviour that have been established as appropriate responses such as taking an aspirin or visiting the doctor.

The example of pain has an undeniable causal element because we relate the meaning of migraines to pain because of the causal relationship between these two phenomena. However much this example therefore looks like a case of signs, Dewey invokes a causal example in order to demonstrate what symbols add to habits of inference in particular. While signs signify further objects, symbols convey rules of action—rules for the interpretation or use of an object. Although we can certainly infer a migraine from the occurrence of a pain of certain qualities, when the phenomenon of pain is taken symbolically—as a meaningful occurrence—it can also be related to any number of further meaningful phenomena such as migraines, dehydration, or dental cavities. Because meanings are, on his account, rules governing the interpretation or use of things, he thinks that by using objects symbolically an organism can relate its behaviour, e.g. its response to the occurrence of pain, to its means and methods for addressing different causes. When pain is meaningful our response to its occurrence becomes related to habits and technologies involved in medicine, whether taking pharmaceuticals or visiting a medical institution. If the meaning of a given pain is identified as a migraine, this carries

implications for what particular responses are appropriate for its resolution. By relating the meaning of the pain to the meaning we attach to migraines, we connect different habits to one another and can use this as our basis for determining appropriate responses to the pain through examining the relation our response has to subsequent forms of behaviour.

Dewey identifies communication as having importance for intelligent behaviour because it "tends to link [habits] subtly together" (EN: 214). Habits become interconnected once they are part of the same language—the same system of meaningful responses—and as a result he thinks communication "subject[s] habit-forming in a particular case to the habit of recognizing that new modes of association will exact a new use of it" (EN: 214). When objects are meaningful, when appropriate habits have been established for their use, we can use this as our basis for forming new habits in a way guided by foresight—with a view to their implications for further forms of behaviour. While certain practices for procuring water might be formed on the basis of communication (i.e. through cooperative action with others), once these habits are represented by meaningful objects, be it through words, artifacts, or natural occurrences, new forms of behaviour might be sought out such that this practice comes to be deliberately developed or modified (e.g. the development of practices of desalinization). When habits are represented by a system of symbols in this broad sense, Dewey thinks we explicitly place our behaviour in a context of other meanings and the relationships between our habits—our rules for behaviour—become open to examination. On this basis we can, although do not necessarily, exert control over our habits. For example, it is because of the rules for interpretation or appropriate behavioural responses that we attribute to phenomena such as headaches and migraines that Dewey thinks our response to the pain becomes capable of

deliberate control. Insofar as we investigate the efficacy of various remedies for our pain—i.e. to the extent that we inquire whether the meaning we attach to migraines yields successful action—we exert control over our behaviour. However, if one takes the appropriate responses of migraines for granted (such as avoiding illumination), one is not exerting control over one's response to the pain but rather behaving as a matter of course. In such a case we might act without having established that such responses are, in fact, appropriate to the circumstances. The development of new ways of interacting with objects is, for Dewey, itself a form of behaviour in which an organism engages meaningfully with objects.

Dewey discusses the advent of currency as a case analogous to the changes that communication brings to behaviour. He says that in the same way that sounds come to have new properties—i.e. acquire meaning—through their use in communication, gold and other forms of currency gain new significance (e.g. exchange value) through their use in commerce. Currency does not merely facilitate "[the] exchange of such commodities as existed prior to its use, but it revolutionizes as well production and consumption of all commodities" (EN: 137). Currency is not only a way of making commercial exchanges easier through calibrating the relative value of disparate commodities in a standard medium. More importantly, he thinks that currency also "brings into being new transactions, forming new histories and affairs" (EN: 137). Through its introduction to systems of exchange, currency revolutionizes commerce as it makes possible new forms of exchange such as interest and credit. Moreover, these new forms of exchange are themselves capable of survey and can be examined in order to refine or otherwise modify practices of commerce.

Dewey sees the impact of communication upon behaviour as similar to the introduction of currency. In fact, the latter is itself a case of the former. Although

communication does not eliminate biological drives for food or procreation, this does not imply that the behaviour involved in responding to these needs remains untouched. Through communication, biological drives are brought into a social context of language (in its widest sense)—a system of symbols—and such drives are transformed as a result. Paola Kindred (2001) articulates Dewey's position as follows, "The physical and organic are 'taken up' in the cultural matrix. This description is an alternative to the idea that somehow social phenomena merely 'lay on top' of physical phenomena, as if physical phenomena are not incorporated into and cannot be altered by the social" (92). Through being 'taken up' in a system of symbols, biological behaviour comes to take on new characteristics and new significance as biological needs call for new behaviours as appropriate. For example, a communicating organism's response to the need for nutrition is not simply as a biological requirement; the biological drive comes to be connected to the behaviours involved in procuring food, cooking, or even ritual feasting. Resultantly, through changes in means or technologies of cooking, or even through the establishment of new ritual uses, an organism's behaviour with regard to its nutrition is likewise changed. Once an organism interacts with objects in meaningful ways, Dewey's point is that such behaviour can be developed deliberately, through active engagement on the part of the organism.

Having now touched upon Dewey's account of the impact of communication on behaviour, I will discuss the impact symbols have upon habits of inference in particular. His position is that symbols enable habits of inference to become articulate in the sense that by using symbols, understood in its broadest sense, we can reflect on our habits by representing them as habits—as dispositions to behave in this and such a way under particular circumstances. However, the importance of symbols

for behaviour extends beyond their capacity to represent or communicate ways of acting. Dewey's position is that once we have a system of symbols—meaningful objects that represent possible courses of action, our behaviour becomes amenable to deliberate refinement. Symbols, he thinks, also allow us to expand the scope of inferences as the relations of concepts we fashion allow for inferences that go above and beyond those that are shaped by the connection of events in experience.

In the case of habits of inference, which Dewey understands as a use of signs, although he is unclear about whether symbols are necessary for an organism to perform conscious inferences, he is at least explicit that he sees symbols as necessary for control to be exerted over habits of inference. He claims that without symbols "no inference could be made that was not blind" (LTI: 61). Without symbols in its widest sense, he thinks that however effective our habits of inference might be—however much the objects that we take to be signs do, in fact, have causal connections to the events we take them to signify, such inferences are blind in the sense that they are formed unconsciously and performed uncritically. Such behaviour is enacted regardless of whether it has been determined to be appropriate and therefore lacks the foresight necessary for these behaviours to be intelligent. Although this point is perhaps banal, for Dewey, the deeper point is to say that once rules for using or interpreting objects have been established through communication an organism is able to behave in such a way that it plays an active role in determining how it will act in future circumstances.

While we might come to treat smoke as a sign of fire through experience of their association, when we use objects symbolically Dewey thinks we can relate smoke not only to fire "but to such apparently unrelated *meanings* as friction, changes of temperature, oxygen, molecular constitution, and, by intervening meaning-

symbols, to the laws of thermodynamics" (58, emphasis mine). Insofar as we are concerned with the meaning of these events—the ways we respond to phenomena such as temperature and friction—we are relating our integrating our behaviour with respect to each of these phenomena. Although physical connections certainly hold between smoke, oxygen, and changes of temperature, by relating the meanings we associate with these phenomena we are able to elaborate, refine, and expand the inferences that we draw from the occurrence of smoke. We can seek to discover what further phenomena smoke has causal connections with and thereby come to treat smoke as a sign of new occurrences—as signifying, for example, specific conditions of temperature. Through the scrutiny of our habits, we might modify the inferences that we habitually draw and also come to draw such inferences deliberately. Through engaging in meaningful behaviour with respect to objects, we can conjecture that certain habits of inference might be fruitful and test these, actively seeking to discover effective cases of inference rather than leaving our habits to be formed unconsciously. Through using symbols in their broadest sense, Dewey thinks we are able to engage in the activity of critically examining, elaborating, and refining the inferences that we make as well as form new habits of inference.

For example, in treating dark clouds as symbols we can examine how the meaning of a dark cloud is, or should be, connected to further meanings, understood as ways of behaving with respect to these phenomena. Treating the dark cloud as a symbol enables us to relate this phenomenon to "such different matters [i.e. the physical phenomena] as differences of temperature and pressures, the rotation of the earth, the laws of motion, and so on" (LTI: 59). When the presence of clouds with a certain hue is meaningful it has connections to the meanings of further phenomena such as barometric pressure—our behavioural response to these conditions, while

barometric pressure is itself connected to the meaning of rain. While dark clouds serve as a natural sign of rain—the inference is warranted insofar as there is, in fact, a physical connection that holds between dark clouds and rain—we can use symbols to specify or determine the physical relation that enables any given cloud to function as a sign of bad weather. We can connect what it means to be a cloud with broader atmospheric conditions and therefore actively determine whether our habitual inferences are warranted, modifying these habits as required.

Dewey takes language, in its widest sense that includes more than words and speech, to be crucial for controlled inference not only because of the relations that meanings bear to one another but because these relations can be examined and developed without reference to actual physical events. The use of meaningful objects, either words or artifacts, enable a communicating organism to engage in the deliberate search for new avenues of behaviour. Through examining the relation that meanings—forms of behaviour—have to one another, the possibility is opened for discovering new uses for old habits, or we might revise old habits for new purposes. Most importantly, such development can be done in a way that is deliberate rather than accidental. For example, we change the way we interact with food through discovering or developing new means for its acquisition or preparation. While the development of technologies of agriculture is expressly for the purpose of establishing a stable food supply, in developing such behaviour we do not merely make our behaviour with regard to food more efficient. The advent of technologies also modifies previous habits with respect to food insofar as previous meanings, e.g. food in ritual, are changed, as is the case in harvest feasts. This is to say that by placing its habits in a system of meanings—ways of interacting with the world, communication makes it possible for an organism to exert deliberate control over the formation of

these habits. We can deliberately search for new avenues of behaviour, which, in turn, modify previous ways of acting with respect to objects.

While Dewey certainly identifies the use of symbols in its widest sense as necessary for the deliberate control of behaviour, this does not imply that he thinks that the use of symbols on its own is sufficient for an organism to exert control over its habit formation, let alone do so intelligently. However, the deliberate search for new avenues of behaviour is at the very least a necessary factor in intelligent behaviour.

4. Conclusion

Dewey argues that language, in its widest sense as the use of meaningful objects, is a necessary factor in the deliberate control of behaviour. Language, for Dewey, is primarily concerned with communication—the establishment of cooperative activity. Communication, he thinks, involves meanings—rules for using and interpreting objects and events. In accordance with this discussion of language in its widest sense, I used the term 'symbol' to refer to any object or event that is meaningful—any object that represents possible courses of action. This definition includes not only speech, but also technological artifacts and natural events insofar as rules for their use or interpretation have been established through communication. More than simply enabling an organism to communicate how it does or will behave under certain circumstances, by using symbols in its widest sense an organism represents its behaviour and places it in a system of other meanings. Through developing the relations that meanings have to one another, itself a case of interacting with meaningful objects, Dewey thinks that an organism is able to deliberately refine its subsequent behaviour.

Although Dewey considers symbols to be involved in controlled inference, this is not to say that he thinks intelligence is the inevitable result of symbol use. For behaviour to be intelligently modified requires that habits themselves be subject to deliberate scrutiny. Using the example of inference, I explored Dewey's claim that absent symbols such habits are formed unconsciously. By contrast, with symbols an organism can consciously and deliberately develop its habits. By using symbols, an organism can connect its ways of interacting with fire, for example, with its habits of determining temperatures or of preparing food. It is through developing the meanings it attaches to events, as well as the connections between these, that an organism exerts control over its behaviour. In the particular case of habits of inference, the development of meanings takes the form of a deliberate search for discovering the capacity for an object to serve as a sign of further events.

Although there are certainly innumerable ways in which symbols or meanings can be fruitlessly connected (e.g. taking my headache to be the result of certain astrological conditions is a way to connect meanings that does not provide insight into how my pain can be resolved) there are certainly more fruitful cases. In identifying my headache as a migraine, for instance, I am committed to the belief that avoiding bright lights and loud sounds would be appropriate responses to my affliction. The deliberate and experimental search for fruitful connections between meanings—ways of interacting with the world—is what Dewey calls inquiry. The practice of inquiry, I will show in the next chapter, is for him explicitly and intimately concerned with the development of meanings. Inquiry, especially scientific inquiry, I will argue, is central to Dewey's view of intelligence. For Dewey, intelligent action requires that behaviour be carried out on the basis of systematically developed knowledge. Intelligence, he claims, enters into behaviour only once meanings—our rules for using

and interpreting objects—have been subject to systematic and experimental development through inquiry (LTI: 63). I will elaborate this process in the next chapter.

CHAPTER II: SYMBOLS AND INQUIRY

1. Introduction

In the previous chapter I explored Dewey's argument that the use of language in its broadest sense as the use of any meaningful object is necessary for an organism to exert deliberate control over its habits. When its habits are represented by a system of symbols, he claims, an organism is able to deliberately change its behaviour in light of a critical examination of the relations that meanings—rules of action—have to one another. This does not mean that control over habits will necessarily result from the mere presence of linguistic abilities. For Dewey, this is achieved through inquiry, which is the topic of the present chapter. Gail Kennedy (1972) summarizes his position thus: "Inquiry enables us to substitute intelligent for blind or willful behaviour; when the perception of future consequences informs present action, what we are doing now becomes meaningful" (67). By means of inquiry, an organism develops meanings—new ways of interacting with phenomena—and does so with a view to fruitful action in the future and can therefore exercise intelligence in its behaviour.

Although he takes inquiries in the natural sciences to be paradigmatic of knowledge acquisition, for Dewey it would be a misunderstanding to think this position implies that science has a monopoly on knowledge (QC: 200). He considers inquiry to be the means through which knowledge of all kinds is attained and subsequently developed and claims that all inquiries deserving of the name have a common pattern, one that is found in science as well as in what he calls 'common sense.' Whether one is fixing a broken computer or developing a theory in chemistry,

in any properly conducted inquiry we employ past knowledge—the results of previous inquiries—in order to (i) determine a problem and its conditions through observation, (ii) develop hypotheses by means of reasoning or engaging with symbols, meaningful objects, and (iii) test these hypotheses as a means of resolving the problem by means of experiment. "Scientific inquiry" he says, "follows the same pattern as common sense inquiry in its utilization of facts and ideas ... which are the products of earlier inquiries" (LTI: 245). Through inquiry, whether in common sense or science, we also develop new knowledge and events thereby come to take on new meaning—we discover new ways of interacting with objects.

In this chapter I will argue that, for Dewey, the behaviour of inquiry involves linguistic abilities in the wide sense described in the previous chapter.[3] I will show this by elaborating his account of the role of language in inquiry and science in particular. I will also argue that Dewey takes scientific inquiries to be those concerned with the ongoing pursuit of truth, which is achieved through the systematic and experimental development of objects, whether words, concepts, or equipment whose meanings (ideally) avoid reference to particular purposes. By arguing that the deliberate development of meanings for the purposes of ongoing inquiry is central to Dewey's discussion of scientific inquiries, I bring attention to the role of language in such behaviour and set the stage for exploring Dewey's identification of the method of science as the method of intelligence, which will be the subject of my next and final chapter.

2. The Pattern of Inquiry

[3] Paul Weinpahl (1967) articulates the role of language in Dewey's theory of inquiry as follows: "For Dewey ... the having of ideas, making predictions, inferring, etc., are dependent upon, indeed are, linguistic behaviour" (274).

Dewey uses the term 'situation' to refer to the numerous and interrelated ways in which an organism is involved in its environment. He negatively defines this term as follows, "What is designated by the word 'situation' is *not* a single object or event or set of objects and events. For we never experience nor form judgments about objects and events in isolation, but only in connection with a contextual whole" (LTI: 72). For Dewey, situations refer to the complex systems of relations that exist between an organism and its environment. Perception, for example, is not simply a passive appreciation of the world. Sight, hearing, and taste are themselves biological processes that involve many interrelated factors. In tasting an apple, our situation includes not only the apple and our teeth and tongues, but also the physical interactions involved in breaking the apple down in a way that facilitates certain chemical reactions with our taste buds.

For Dewey the situation of an organism includes physical conditions such as weather, sources of food, the way these are physically connected, as well as the organism's biological states such as hunger, pain and the way these are responded to through interaction with its environment. The organism's biology, in particular, is an important factor in its situation as its system of digestion, for example, determines which parts of its environment can serve as sources of nutrition. More generally, the processes involved in digestion and nutrition are themselves part of a broader integrated system of biological functions since the energy acquired through food is subsequently involved in the maintenance of health and procreation.

It is crucial to note that Dewey considers situations of language-using organisms to include their relations to the physical environment as well as their cultural environment. "Of distinctively human behaviour," which includes more than just inquiry, he says "it may be said that the strictly physical environment is so

incorporated in a cultural environment that our interactions with the former, [and] the problems that arise with reference to it, ... are profoundly affected by incorporation of the physical environment in the cultural" (LTI: 49). As was discussed in the previous chapter, the cultural environment changes an organism's relationship with its physical and biological environments. The way of addressing the biological need for nutrition, for instance, is profoundly affected by the cultural means at an organism's disposal. As technologies of cooking are developed or new rituals and traditions involving food arise, an organism's ways of behaving with respect to food is likewise changed. The development of agriculture, for example, reduced the need for hunting or gathering as a means of acquiring food. Such techniques also introduced the possibility for the deliberate cultivation of food sources and therefore also facilitate surpluses for use in feasts.

For Dewey, the importance of discussing these seemingly trivial claims about the nature of organisms is that he thinks we can understand the development of knowledge in these terms—as another form of behaviour in which an organism is interacting with its environment in particular ways. On his view, the development of knowledge is a case of organic interaction that takes the form of an interaction and use of meaningful objects in particular. In this sense, he takes language in its widest sense to be necessarily involved in the development of knowledge, as linguistic organisms—those that use objects symbolically (which includes not only words)—respond not only to their physical environment, but also to the meanings that their environment has acquired through its cultural and social use.

For example, although water is necessary for the biological functions of an organism and to that extent has uses common across all human cultures, the biological requirement for water does not fully determine the symbolic meaning of the liquid—

what uses or purposes it suggests as possible ways of interacting with it. On this view, Dewey thinks that the invention of plumbing changes the meaning of water, changes its capacity as symbol insofar as plumbing makes possible new uses and forms of behaviour such as is found in developing and maintaining systems of sanitation. As well, the advent of such technologies has a further impact upon previously established uses as water becomes more readily available for cooking or cleaning. As I will show, the situation of inquiring organisms is cultural insofar as inquiries involve the use and development of "the *meanings* provided by language" (LTI: 66, emphasis in original).

For Dewey, inquiry is one form of response to what he calls an indeterminate situation. What makes a situation indeterminate is that it does not call for one response over another. If I find myself afflicted by a sudden pain, its occurrence is indeterminate insofar as it does not call for any particular response or remedy. If such pain is unprecedented it will not necessarily prompt any definite response and therefore it's meaning is indeterminate.

Although Dewey considers indeterminate situations to be an antecedent condition of inquiry, not all indeterminate situations necessarily provide the impetus for inquiry. If I have a headache and simply lie down or take an aspirin in hopes that the pain will subside, no inquiry has been carried out. However, if my pain does not subside or if it gets worse, my inaction would be inappropriate. In such a case, the situation would be one that calls for inquiry.

Inquiry begins once an indeterminate situation is identified as problematic—as calling for inquiry as an appropriate response. Dewey calls this first step in inquiry the 'institution of a problem.' To identify a given situation as problematic does little to solve the problem; nor does it take inquiry very far. However, once a situation is

identified as problematic—as requiring inquiry—the next step is to determine the nature of the particular problem through observation. Without knowledge of further conditions surrounding the pain, to identify it as a headache, for example, does not provide a precise means of resolving the situation. Without reference to further conditions, a headache suggests no possible remedies aside, perhaps, from taking aspirin.

While an appropriate response to the pain is unknown at the beginning of inquiry, through observation one attempts to determine the known elements of the situation in a way that brings insight into the nature of the problem, i.e. through identifying its conditions. Problems do not occur without conditions, whether natural, social, psychological, etc. Determining the relevant factors of the problem is required for discovering possible ways of resolving the situation. For example, if the headache is accompanied by sneezing, allergies are a possible cause. In this case, our means for resolving allergies, e.g. the availability of antihistamines, might become relevant factors in resolving the problematic elements of the situation. If I find that bright lights and loud noises make my headache worse, my pain is possibly a migraine, which would call for a different response than a headache caused by allergies.

If factors relevant to the problem are not immediately apparent, then observation might take the form of troubleshooting. Observation, for Dewey, is not simply a passive assessment of the situation, but rather is a case of overt behaviour. He takes troubleshooting to be paradigmatic of observation because it is a case in which the relevant factors of the situation are determined by means of interacting with and manipulating the environment. Through troubleshooting—isolating and varying the conditions of the situation—one determines the relevance of elements by observing the consequences that actions upon these elements have with respect to the

problem. To briefly use an example other than pain, if my problem is that my computer won't turn on, I can observe the relevant conditions of the situation by checking whether the computer is plugged in. If this doesn't work, I can test another device in the socket, examine the fuse, and so forth. If the electrical system works for other devices, then the problem is likely related to the computer's power supply unit. By performing these actions in turn I can identify which elements of the situation are relevant to the problem, determine which are not, and thereby specify my problem more precisely.

Careful observation of the situation is crucial because the way a problem is stated determines which "specific suggestions are entertained and which are dismissed; what data are selected and which rejected; [the statement of the problem] is the criterion for relevancy and irrelevancy of hypotheses and conceptual structures" (LTI: 112). To return to the example of the headache, if I identify the pain to be the result of allergies, relevant conditions will involve the presence of pollens or other allergens in my environment, my history of allergies, whether I am a pet owner, etc. At the same time, to characterize my problem in this way eliminates other factors as irrelevant, e.g. whether I have a history of migraines, my level of stress, etc. Of course, if the problem is misidentified subsequent inquiry will be misdirected. Misidentifying the problem might lead to observation of conditions that are irrelevant to the problem at hand. Perhaps my headache is actually a migraine, in which case determining whether I am allergic to certain pollens will be irrelevant, while my history of migraines and my nutrition or level of stress would be factors in need of, but not receiving, observation.

As the way in which one identifies a problem suggests potentially relevant data to be observed, the next step is to determine possible solutions—possible courses

of action with respect to the situation. If I know that I am allergic to ragweed and have determined that this pollen is present in my environment, possible solutions will include taking an antihistamine or finding a way of mitigating the effect of pollen, for example, by installing an air purifier or air conditioner. To properly identify a problem does not necessarily imply that solutions will be immediately apparent. Even if I am correct to identify my headache as one caused by allergies (a case in which taking an antihistamine remains a viable response) without knowledge of what is causing my reactions I lack the background for fully resolving the situation. In such a case, further observation will be required in order to determine the pollens to which I am allergic. If I discover that I am allergic to the pollen of oak trees, then removing the tree from my yard becomes a potentially viable course of action, as this would eliminate a condition that might give rise to further headaches. Although it is unlikely that there can be a general account of how ideas 'pop' into our heads, Dewey thinks there is at least something to be said about the development or assessment of hypotheses.[4] For him this is achieved through reasoning—the evaluation of ideas as proposals for resolving the problematic situation.

For Dewey, the use of computer simulations is exemplary of the role of symbols in reasoning. For example, computer simulations are used in order to increase the success rate of satellite launches. Such simulations calculate the relation of conditions to one another, wind resistance, engine power, etc., in order to determine successful launch trajectories. While running and building such simulations are undeniably actions, Dewey says that through rehearsing the launch by means of such symbols we "act without acting" in the sense that our simulation does not require a commitment to launching the actual satellite (QC: 120). If the

[4] "The occurrence of suggestions," Dewey says, is "in last analysis a brute fact, alogical. It happens or it doesn't" (MW13: 66).

simulation fails, we can modify the variables and run it again without risk.

Dewey identifies reasoning as a behaviour using symbols.[5] Although it is tempting to read this claim as the view that we reason by means of symbols in the narrow sense as words, this is not a wholly correct interpretation of his position. In describing reasoning, the emphasis is placed upon meanings, which, as was described in the previous chapter, are found equally in the case of words and other artifacts. In either case, we examine the viability of possible courses of action insofar as objects—whether words, artifacts, or natural occurrences, are meaningful. The upshot of this behavioural description of reasoning, for Dewey, is that it is unnecessary to go beyond linguistic abilities, in its widest sense as meaningful interactions with objects, in order to explain mental processes such as thinking, deliberation, or reasoning. Emphasizing the importance of behaviour, he says that reasoning is "an *experiment* in making various combinations of selected elements of habits and impulses, to see what the resultant action would be like if it were entered upon" (MW14: 132-3, my emphasis). On his view, reasoning is a behaviour in which we examine the worth of possible courses of action. Such behaviour can take the form of what he calls 'rehearsing' the act through stating possible courses of action through speech or writing, but it can equally apply to cases of interacting with meaningful objects in the world.

With respect to my headache, for example, if the oak tree is a meaningful object, i.e. one that represents possible courses of actions, I can contemplate possible ways of interacting with this object in certain ways, as well as its consequences for future behaviour. I deliberate about the possible implications of my courses of action

[5] "To say that language is necessary for thinking is to say that [symbols] are necessary. Thought deals not with bare things, but with their *meanings*, their suggestions " (LW8: 301-2).

with respect to this object. I might, for example, consider cutting down the tree as an appropriate response in these circumstances. Although this course of action will not necessarily solve my present headache, it will reduce the risk that such headaches will recur. However, if there are other overriding considerations, e.g. if I need to work later in the day, then quickly resolving my headache will be necessary and cutting down the tree will be less viable. In such a case, I determine that eliminating the tree is incompatible with my present situation because this course of action would require too much time. Instead, I could take my headache as the locus of my action. Now knowing that my pain is caused by allergies, possible responses will include sinus irrigation, taking an antihistamine, or both. In this way we can also determine that certain possible courses of action are unwarranted. Although my headache might call for an antihistamine, I might have allergies to certain brands. In this case, this factor must also be accounted for during my deliberation as taking such an antihistamine could have worse consequences for my health than any headache. Deliberating about each of these courses of action is symbolic for Dewey insofar as they are carried out with respect to meanings—possible actions with respect to the elements of the situation.

By interacting with meaningful objects in the widest sense, Dewey thinks we can anticipate the consequences of our actions before we act to directly resolve the problematic situation. By rehearsing possible courses of action through reasoning, we attempt to determine possible solutions—possible courses of action—by examining the relevance and implications that suggested courses of action might have for the problematic situation. Such deliberation occurs in advance of trying out the hypothesis. Dewey describes this process as "developing the meaning-contents of ideas in their relations to one another" because, in deliberating about one's response

to a given situation, one examines meanings—possible courses of action—in terms of their consequences for further action, i.e. through assessing their worth as hypotheses (LTI: 115). Behaviour in competent inquiry is, in this way, characterized by foresight.

For Dewey reasoning is not the whole of inquiry but rather only one part of it. However much reasoning we might engage in before deciding which hypothesis should be acted upon, it is only once a hypothesis is tested that we can ultimately determine what its actual consequences will be. Although I hypothesize that removing my tree will eliminate the occurrence of headaches, the expectation on its own certainly does not guarantee that events will unfold as anticipated. Perhaps this course of action will have little effect upon my headache. In such a case, my test for allergies might have been incorrectly done, or I might have further allergies that also need to be accounted for. In either case so long as my problem remains, further inquiry is called for. Dewey only considers an inquiry to end once a hypothesis is enacted to resolve the original problem by changing the conditions that made the situation problematic, e.g. by removing the tree or other allergens. I do not simply eliminate the headache in this way, but also fashion the means for responding to these circumstances in the future. As a result we change the indeterminate situation into a situation that calls for a definite response through developing new meanings—new ways of responding to conditions. Through inquiry, my headaches and even pollen come to take on new meaning—they call for new responses as appropriate. Most importantly, through the process of inquiry we play an active role in the formation of these new habits on the basis of experiment.

Having examined Dewey's discussing how the behaviour of using of symbols and meanings are involved in his account of inquiry, I will now discuss how he sees

scientific inquiries to be set apart from what he calls common sense. While he thinks that both common sense and science share the pattern outlined above, he identifies scientific inquiries in particular to be exemplary of intelligent behaviour. I will show how symbols, in his sense as meaningful objects, whether word or artifact, play a particularly important role in scientific inquiry, which is what Dewey calls the method of intelligence.

3. Common Sense and Science

Dewey frames the difference between common sense and science in terms of different languages, or sets of symbols. The language of science—its system of meanings—is experimentally determined independently of possible purposes. Although he defines meanings as rules for using or interpreting events, what makes scientific meanings distinct from the meanings used in common sense is that they are framed without reference to particular purposes.

The problems of common sense inquiries, Dewey says, are particular to specific cultural conditions. Examples of such problems would include matters such as fixing a broken car or securing transportation to an event by other means. In such cases, the problematic nature of the situation arises because of the role of cars and other forms of transportation in achieving particular ends. A broken car is only problematic insofar as it cannot serve as a means of transportation. Dewey claims the problems of science are by contrast culturally neutral in the sense that, if properly conducted, they are framed in a way that avoids reference to particular cultural practices, or applications of knowledge. It is, of course, debatable whether any given theory in the sciences actually achieves this ideal. However, as an ideal for how scientific inquiries should proceed, we can say that a theory fails to be scientific to the

degree that its results only hold for members of a particular group. For example, the rate at which objects fall can be determined independently of any possible applications of this knowledge. The laws of motion describe how events unfold independently of human involvement.

Common sense, says Dewey, is a system of meanings that are primarily determined in virtue of their role in social interaction and communication, i.e. for purposes of establishing cooperative action with others. The symbols of common sense, "hang together not by virtue of their examined relationship to one another, but because they are current in the same set of group habits and expectations" (LTI: 55). If a particular group uses water for sport, ritual, and farming, these uses form a system in the loose sense that they are common in the group's expectations and ways of interacting with the world. This system hangs together because of "group activities, group interests, customs and institution" (LTI: 56). The meanings of common sense, while they might be developed independently from each other, are interconnected insofar as they enter into "common everyday language of communication between members of the group" (118).

While the uses of water for the aforementioned purposes are certainly valid insofar as the liquid can adequately serve these purposes, the meanings of water for each purpose is independent from the others in the sense that each of these ways of interacting with water has little or no bearing on the others. Each meaning functions under different circumstances—they are relevant to particular situations. However, this is not to say that the meanings of common sense are completely disparate. For example, learning how to use water for swimming also provides the means for using of water in further sports such as water polo.

Part of what sets common sense apart from science, for Dewey, is that in the

former there is no requirement that the development of meanings be more than piecemeal. While the knowledge that water is effective for swimming has implications for its use in some further sports, it is both unlikely and unnecessary for the purposes of common sense to investigate whether new uses of water in sport have any bearing upon the meaning of water in other contexts, such as agriculture. As a result, Dewey does not see the system of common sense meanings to necessarily involve or require rigorous development or even complete coherence as a system.

To say that common sense does not form a rigorous system of meanings is not meant as criticism: these meanings have an indispensable role in the establishment of cooperative activities. However, the effectiveness of the common sense system of symbols for facilitating action with others has little bearing upon its worth or suitability for the ongoing development of knowledge. Dewey takes the symbols of common sense to be "loaded with meanings that are irrelevant to inquiry conducted for the sake of attaining knowledge as such" because they are primarily concerned with particular purposes and resultantly might lack the foresight necessary for the ongoing pursuit of truth (LTI: 421). For example, the meaning of water as a factor in transportation does not lend itself to fruitful generalization because this use does not have relevance for determining how this liquid behaves under other conditions, e.g. with respect to changes in temperature or pressure, or even the use of water for further purposes such as ritual. For this reason, Dewey insists that common sense inquiries, to the extent that their primary concern is the use of water for particular purposes, "need to be discriminated from inquiries that are distinctively scientific, or that aim at attaining confirmed facts, 'laws' and theories" (67). Meanings that make reference to particular purposes have the potential to be at odds with the project of developing subsequent knowledge.

In scientific inquiries the aim is to discover the laws that govern events and to do so independently of possible applications of such knowledge. Scientific inquiries, he thinks, facilitate the ongoing pursuit of truth through developing a system of technical symbols—symbols that are "freed from direct reference to the concerns of a limited group" (LTI: 119). He identifies the ideal of science to be the experimental and systematic development of a language—a theoretical system of meanings—in which particular cultural purposes play no justificatory role. While political, military, or industrial purposes might undeniably motivate the development of one field of knowledge over another, Dewey's point is that such factors cannot be taken as a primary consideration in the ongoing pursuit of knowledge and to that extent must be set aside or, at the very least, be tempered. Of course, whether any given inquiry achieves this ideal remains an open question.

Dewey takes the "controlling consideration", the central goal of scientific discourse to be the development of a coherent system of knowledge rather than, as is the case with common sense, a language that primarily serves to facilitate cooperative action with others (LTI: 119). Analogous to the invention of tools such as microscopes, which enable new ways of observing and interacting with phenomena, Dewey sees the language of science to facilitate the ongoing advance of research. "The invention of technical symbols," i.e. symbols and meanings that are expressly determined for use and development in inquiry, "marked the possibility of an advance of thinking from the common sense level to the scientific" (QC: 121-122). We can develop technical equipment, such as computer simulations, to facilitate the pursuit of, for example, protein folding. Equally, we can develop particular concepts to facilitate future research, such as found in the symbolization of chemicals in the periodic table.

Through determining that water is a molecule consisting of two hydrogen atoms and one atom of oxygen, the meaning of water for science becomes identified in terms of its chemical composition (H_2O). In doing this, new avenues for the subsequent development of the meaning of water are opened up. For Dewey, the meanings that make up science are "defined in terms of their consequences with respect to one another" (EN: 148). In understanding water as H_2O, and hydrogen gas as H_2, for example, we identify the meanings of these two molecules in terms of their chemical relations and thus explicitly connect the liquid in a system of meanings, which includes the periodic table, molar mass, properties of reactivity, etc. By identifying the meaning of water in terms of its chemical composition we can investigate what role this composition plays in how it reacts with regard to other chemicals, or how much electricity is involved in the decomposition of water into hydrogen and oxygen gas. Although the knowledge that water is product of hydrogen and oxygen might have applications for the development of emission-free engines and such uses might motivate the investigation of more efficient reactions, when the results of scientific inquiry are formulated they are stated in a way that tells us how water will behave in subsequent inquiries regardless of purpose.

Although Dewey thinks that the system of science facilitates the ongoing pursuit of truth by developing meanings without direct reference to social purposes, he resists the claim that the scientific conception of water has some closer connection to reality than the meanings of common sense by virtue of such abstraction.[6] "Water," he says, "still has the meanings of water of everyday experience when it becomes the essence H_2O" (EN: 152). Water, H_2O, is intimately involved in practices

[6] Paola Kindred (2001) elaborates Dewey's position as follows, "Science is a way of understanding phenomena that liberates it from the confines of cultural categories and schemas, but its way of understanding phenomena does not become the *only* way to understand it" (188-9).

of farming and is used in sport and ritual. The difference between understanding this liquid as water and as H_2O rather lies in the connection our understanding has to further meanings. While the meaning of water in common sense is concerned with the role of this liquid in particular purposes, the scientific meaning (H_2O) connects the liquid to theories of chemistry, properties of reactivity, physics, etc.

The identification of water as H_2O expands the range of potential uses of water for everyday activities—water comes to take on new meaning and represents new possibilities of action. This identification also suggests new purposes, e.g. the use of water as a source of hydrogen gas for fertilizer. The agricultural meanings or uses of water are thereby expanded because water no longer simply plays a role in the hydration of plants, but can also be used for the nourishment and maintenance of crops in new ways. Through its connection to the periodic table and other subsequent meanings, the scientific conception of water "enormously refines, expands and liberates the contents and the agencies at the disposal of common sense" (LTI: 72). In distinctively scientific inquiries, he thinks, we develop new meaningful objects, whether words of experimental apparatuses, that facilitate the discovery of new ways of interacting with the world.

4. Conclusion

In this chapter, I examined Dewey's account of the role of symbols in inquiry and used this understanding to argue that, for him, scientific inquiry involves the rigorous development of a system of symbols and meanings. First, I discussed how the cultural environment, i.e. the meanings that things acquire through social intercourse, is necessary for an organism to characterize its situation—its relationship to its environment—as problematic and therefore calling for inquiry as a response.

Meanings—rules for the use and interpretation of objects—also provide the initial basis for determining which data might be relevant to the problematic situation, enabling the development of hypotheses through observation and reasoning. For Dewey, inquiry involves language in the broad sense of interacting with objects in meaningful ways. In modifying its situation through resolving its problem, an organism develops new meanings to the extent that its discovers new ways of interacting with its environment.

Although the inquiries of common sense and science share a common pattern, Dewey sees scientific inquiries in particular to be an exemplary case of inquiry. For him what sets scientific inquiries apart from common sense is that in the former meanings are systematically developed for the express purpose of serving as a tool in further inquiries. I used the example of water to elaborate the distinction between common sense and science. While the meaning of water for common sense is concerned with purposes such as washing, cleaning, and ritual, these uses are only connected to one another as activities shared by a community. By contrast, in identifying water as H_2O, science uses a meaning of water that does not make reference to particular purposes. It rather connects this liquid to the meanings of further objects such as hydrogen and oxygen, and, via the periodic table, possible chemical reactions. By identifying the meaning of water in terms of its chemical composition, scientific inquiries define water in a way that enables the chemical analysis of water to explicitly serve as a tool in future research. For example, the chemical meaning of water explains how and why it functions as a valuable catalyst in many chemical reactions. Although the ideal of the scientific language is that it avoids reference to particular purposes, it also suggests new uses for events insofar as these meanings might inform new uses of the physical environment.

Having established that the systematic development of meanings is what sets scientific inquiries apart from those in common sense, in the next chapter I will argue that this discussion is crucial to Dewey's identification of the scientific method as the method of intelligence. For him, science is exemplary of intelligent belief formation as it is the best means available for developing knowledge—i.e. generating stable beliefs and ways of interacting with the world. Having established the particular importance of symbols in scientific inquiry, I will show how language—or symbol use—plays a central role in his account of intelligent behaviour generally.

CHAPTER III: SCIENCE AND INTELLIGENCE

1. Introduction

Dewey primarily contrasts intelligent behaviour with behaviour that is routine. Insofar as an organism behaves uncritically, i.e. as a matter of course, he thinks it is not exercising the foresight necessary for its behaviour to be considered intelligent. He identifies the capacity for language—the ability to use objects, whether word, artifact or natural occurrences, meaningfully—to be a crucial element in intelligent behaviour. This is because through, interacting with such objects in meaningful ways, an organism is able to deliberately change its habits through examining the relations that meanings—the behavioural responses that such objects evoke—have to one another. Through such examination, an organism is capable of modifying its habits and thereby exerting control over otherwise routine forms of behaviour.

In the last chapter I discussed Dewey's claim that the behaviour of inquiry is the primary means through which habits and meanings are deliberately developed. While he identifies the use of symbols (in its widest sense) as necessary for inquiry, this capacity is not sufficient. He says "[inquiry] is not identical with the mere fact that one thing indicates, means, another thing" (LW8: 120). For example, we do not inquire if we simply take for granted that the occurrence of pain calls for aspirin as a response. Inquiry requires that an organism experimentally determine whether such a response to pain is appropriate or warranted given the situation. Inquiry involves the critical use of symbols—the deliberate scrutiny of "the reliability, the worth, of any particular indication [i.e. meaning]" (120).

I show in this chapter how language, in what Dewey calls its widest sense,

plays a necessary role in his account of intelligent behaviour more generally. I will begin by exploring his discussion of the method of science in order to provide a more detailed understanding of his notion of intelligence. As Dewey understands the scientific method to be primarily a method for critiquing, forming, and warranting beliefs, I will examine the sense in which he views the natural sciences as exemplary cases of inquiry and therefore exemplary of intelligent belief formation. As the method of intelligence, the formation of beliefs through scientific inquiry provides a basis for intelligent action. I conclude by contrasting my understanding of Dewey with that of Richard Rorty in order to emphasize the distinctiveness of Dewey's account of the role of language.

2. Science as Method

As Dewey uses the phrase, the scientific method refers to "*the* method of criticizing beliefs" (EN: 315-6, emphasis mine). It is a way of critically forming beliefs that he describes as "nothing but experimentation carried out under conditions of deliberate control" (MW9: 281). Daniel Wilson (1995) elaborates Dewey's position on the method of science in "Pragmatism, Science, and Logical Positivism". Here, he claims that for Dewey, "The scientific method of knowing [is] a process through which certain results [are] attained by hypothesis, test, and validation. Knowledge, in all fields, not only science, 'is an affair of *making* sure, not of grasping antecedently given sureties'" (128). Most importantly, knowledge is the result and achievement of certain ways in which an organism interacts with its environment. Any belief worthy of being considered knowledge is the result of deliberate and competent inquiry, regardless of subject matter. In this section I will examine what Dewey means by these descriptions of science, as well as examine what importance

he takes these characterizations of the scientific endeavor to have for his notion of intelligent behaviour.

In Dewey's thought, the word 'scientific' is primarily intended as a description of a certain way of forming beliefs, a description informed by our knowledge of past successes and failures in ways of conducting inquiry. As he uses the word, there is also a normative dimension to being 'scientific', as this, for him, means that one is employing the best methods available for conducting inquiries. The notion of 'best' practices of inquiry, for him is to be elaborated in terms of his broader of inquiry. We arrive at our knowledge of better and worse methods of inquiry a comparative analysis of methodologies—an inquiry into how and why certain ways of achieving knowledge are more effective than others. "Through comparison-contrast," he claims, "we ascertain *how and why* certain means and agencies have provided warrantably assertible conclusions, while others have not and *cannot* do so in the sense in which 'cannot' expresses an intrinsic incompatibility between means used and consequences attained" (LTI: 108).

Dewey elaborates the normative aspect of his theory of inquiry through analogy with other activities. "The way in which men *do* 'think'", he says "denotes [...] simply the ways in which men at a given time carry on their inquiries. So far as it is used to register a difference from the ways in which they *ought* to think, it denotes a difference like that between good and bad farming or good and bad medical practice" (107). Good practices of farming are those that not only produce adequate food for present purposes, but are also practices that have been proven to facilitate agriculture in the long term. Over the long history of human agriculture, we have discovered that good and sustainable farming methods include crop rotation and also employ means to minimize runoff or other harm to the ecosystem. In considering

such factors in the way we conduct farming, although we might have smaller yields in the short term, we make the land more conducive for agricultural uses over the long term and therefore ensure that this practice will remain feasible for future generations. For Dewey what is crucial to the analogy between a normative account of faming techniques and a normative account of inquiry is that he considers both to be forms of behaviour. They are ways in which an organism engages with its environment to effect results. It would be absurd to suppose that *a priori* reflections would be sufficient to establish some methods of farming as superior to others. Why, then, Dewey asks should we expect that an *a priori* reflection on the method of science would tell what makes certain practices more suitable for developing knowledge than others.

With respect to proper ways of conducting inquiry, Dewey says, "Men think in ways they should not when they follow methods of inquiry that experience of past inquiries shows are not competent to reach the intended end of the inquiries in question" (LTI: 107). As it is difficult to understand his point when stated so abstractly, I will elaborate this claim by example. With respect to medical research, it was an important methodological discovery that placebos could be used in determining the effectiveness of a pharmaceutical's effectiveness through double-blind studies. Without controlling for the expectations of both the patients and inquirers, we discovered that drug studies are inadequate to their express purpose—they do not yield reliable beliefs nor do they facilitate reliable action. Given factors such as human psychology, inquiries into whether pharmaceuticals achieve their various purposes can only be achieved through methodologically employing placebos—so far as present knowledge suggests. Most importantly, the effectiveness of inquiries that do not account for such accidental bias is a testable phenomenon—it

is demonstrable through inquiry that the results of drug studies that neglect this factor yield conclusions that are not warranted and, accordingly, we consider such studies to be intellectually irresponsible.

According to Dewey, a normative theory of inquiry requires an experimental investigation of the relative effectiveness that different methods—ways of conducting inquiry—have for their varying purposes. Although we must inevitably employ some method of inquiry when investigating the relative effectiveness of methods of inquiries, Dewey does not see this to be necessarily problematic. Although our method might justification for its own use, there are degrees to which this might be problematic. On one end of the spectrum, the ability to justify our own methods in this way does not rule out the possibility that we might discover that we could be conducting our inquiries in more fruitful ways—in ways that provide better means for resolving the problematic situations that give rise to inquiry.

At the most general level, he thinks that what makes a given practice of inquiry successful is that it, "tends in the long run, or in [the] continuity of inquiry, to yield results that are either confirmed in further inquiry or that are corrected by the use of the same procedures" (LTI: 21). If we employ a method of investigation that admits of fallibility and is open to subsequent development in the face of new circumstances, then it is possible that we might discover that it requires modification or further development. On the other hand, if a method of inquiry justifies itself in too closed of a circle, then it is likely that it would be at risk of closing itself off to subsequent development and therefore be unlikely to assimilate new results in a way that informs how future inquiries would be better conducted. Although at any given time we are limited by whatever knowledge and methods are presently available, Dewey does not take this to be an issue so long as our knowledge and methods remain

open to subsequent development through the application of results to new situations and circumstances, as well as through the use of these results in guiding future lines of investigation.

Although he describes competent or successful cases of inquiry as being ones in which past results are being 'corrected', this is easier said than done. How are we to distinguish the cases in which past results are corrected from ones in which good results are thrown out prematurely? Dewey's response is that we are unable answer such questions in advance of inquiry. For us to take seriously the charge that we have incorrectly weighed evidence is to say that the subject requires further investigation. We might, of course, prematurely dismiss some scientific data. However, the way to resolve such situations is methodological—we employ a method that does not rule out such possibilities and rather attempts to resolve them. According to Dewey, this requirement is met by what he calls systematic and reflective inquiry.

What makes an inquiry systematic, for him, is that the results of inquiries are determined in a way that they serve as tools in future investigations. I detailed what makes an inquiry systematic in the previous chapter when contrasting the inquiries of common sense with what Dewey considers distinctively scientific inquiries. What makes a method of inquiry reflective, on his account, is that both that results and the method for conducting inquiry are required to be subject to test and warrant through inquiry. Both of these requirements, he sees, as met, and exemplified, by the inquiries found in the sciences.

Felix Kaufmann (1967) observes that what is central to Dewey's philosophy of science is the claim that "Scientific criticism is an integral part of scientific inquiry. In stipulating the objectivity of scientific knowledge, and in repudiating arbitrariness and bias in the conduct of research, we imply that every step in inquiry, every change

in the body of knowledge or in established methods, is subject to scientific criticism" (223). Although Dewey would not share Kaufman's claim that we stipulate the objectivity of science,[7] he would agree with his assessment that what makes inquiry scientific is the fact that everything involved in scientific investigations is ultimately open to further investigation.

For Dewey, what makes the scientific method exemplary of inquiry is that it is both systematic and reflective in the senses described above. Such inquiries are not only set apart from many other cases of inquiry as they are undertaken primarily in the pursuit of knowledge, but also because they employ the best means available for conducting inquiries—for deliberately scrutinizing our habits as well as the meanings we attach to events. Having now described the sense in which Dewey sees the scientific method as exemplary of inquiry, I will now briefly return to his claim that it is self-corrective.

Above, I claimed that, for Dewey, a successful method of inquiry is one that is self-corrective. However, it is not immediately clear that his description of systematic and reflective inquiry are able to meet the strong claim that our system for developing knowledge is self-corrective—that it is getting closer to the truth. In attempting to meet this objection, Dewey does not go beyond his comparative analysis of inquiry. We know, he claims, based on our history of inquiry, that reflective and systematic ways of developing knowledge have yielded better theories that are better at prediction than theories formed without meeting these requirements. Inquiries that are reflective and systematic, to the best of our knowledge, are better at resolving problematic situations over the long run. Having now described the normative

[7] Dewey describes an inquiry as objective insofar as it "discount[s] and eliminate[s] merely personal factors in the operations by which a conclusion is reached" (LTI: 50). This formulation, like Kaufman's, links objectivity with the self-corrective nature of scientific inquiry.

underpinnings of Dewey's account of scientific inquiry, I will now turn to the question of how this relates to his account of intelligent behaviour.

For Dewey, the practice of science is exemplary of intelligent behaviour less because of its results (e.g. theories, knowledge, technology) than because of how it discovers, develops, and tests them. If science is identified too closely with its results, whether scientific laws or empirical generalizations, he thinks that we are at risk overlooking what makes scientific inquiries exemplary of inquiry. He takes the position that if 'science' is taken to refer to nothing other than particular bodies of knowledge, i.e. the propositions accepted as true in physics and biology, we blur the difference "between action dictated by caprice and the conduct of arts that embody technologies and techniques expressing systematically tested ideas" (434-5). If we take 'science' to refer to nothing more than certain bodies of knowledge we risk ruling out certain fields of belief as inherently incapable of scientific, i.e. intelligent, development.

For Dewey, it is a confusion to think that ethical or religious questions are less worthy of scientific consideration because fields such as physics and biology do not provide answers to such problems. According to him, whether any field exhibits 'scientific traits' is rather a matter of how we form beliefs with respect to a given subject matter—whether the application of the scientific method can provide a fruitful means for examining and resolving the problems of a field. To declare the scientific method of conducting inquiries as limited to, or seen as only having relevance for, particular subject matters, means we overlook "the enormous difference that exists between activities that are routine and those that are intelligent" insofar as we lack a basis for distinguishing behaviour grounded in the results of competent inquiry from activities that are predicated upon mere apologetics or blind advocacy (434-5).

To claim without recourse to inquiry that any subject matter cannot be dealt with through experimental means is a position he considers nothing other than dogmatic. Such matters, he claims, are best decided through particular inquiries into the effectiveness of methods employed in any given field to yield beliefs that stands up to the scrutiny of further competent inquiries. Although the particular methodology of a field will depend upon the nature of the subject matter, e.g. experiments in biology require sensitivity to different factors than is required in physics, Dewey thinks that some traits are common to all cases of inquiry, and that the nature of warrant is the same regardless of subject matter. Although he certainly attaches importance to the methods of the natural sciences, it would be a mistake to interpret this as the claim that the content of the natural sciences is definitive of knowledge. They are rather what he considers to be the cases of inquiry in which the general pattern of knowledge is most readily apparent and the conditions of warrant are best understood. Scientific inquiries, for him, are inquiries "in which are written large the essential characters of any knowing"—at least so far as present knowledge suggests (QC: 200).

One of the crucial elements of what makes the scientific method of inquiry a case of intelligent behaviour is that it admits of fallibility. For Dewey, fallibalism—the position that any of our beliefs could be discovered to be false—follows from his accounts of both habits and inquiry. Habits and beliefs, he thinks, are ordinarily formed and shaped through an organism's interaction with its environment. However, being formed on such a basis provides no guarantee that habits will remain effective in future cases. We live in a changing world, says Dewey, in which, "the future, although continuous with the past, is not its bare repetition" (LTI: 46). Situations change, and one's habitual ways of responding can cease to be appropriate. For

example, if drought occurs, habitual behaviour might cease to be appropriate as food and water supplies might require rationing. To act through blind habit despite changing circumstances invites ruin.

Fallibilism, for Dewey, is nothing more than an acknowledgement of our epistemic situation. He thinks that little more is required than to look at the history of science, which shows that "hypotheses have been taken to be finally true and hence unquestionable, ... have obstructed inquiry and kept science committed to doctrines that later turned out to be invalid" (LTI: 145). To deny the fallibility of any belief is a position that has proven more likely to hinder intelligent action in the future.

On this theme, Alison Kadlec (2007) notes that for Dewey, "our best shot at producing and sustaining intelligent conduct begins with the abandonment of our demands for certainty" (24). For Dewey, what makes inquiry a case of intelligent behaviour is that it is a means through which we attempt to mitigate the inevitable fallibility of our behaviour. In fact any method of inquiry that declares some knowledge to be certain—immune to possible revision—would be a method that risks undermining its intended goal of the pursuit of truth. To declare any belief or practice as certain—as immune to future inquiry—has proven in the past to cause more harm than good for the ongoing development of knowledge. The methods of scientific inquiry, for Dewey, exemplify intelligent formation of beliefs because they are the best methods available for mitigating our potential fallibility and the impact this might have our action. This, however, is not to say that our methods, too, are not subject to further scrutiny or development. In fact, as scientific inquiries demand the self-conscious and critical assessment of their methods, they exemplify (although are not exhaustive of) intelligence as such inquiries require behaving in light of systematically tested knowledge and also involves the self-conscious concern with

developing its own methodology.

3. Response to Rorty

Having now provided an understanding of Dewey's account of intelligence as well as having explained why he takes science to be exemplary of such behaviour, I will now respond to two of Richard Rorty's criticisms of Dewey's account in order to draw out the uniqueness of Dewey's account of the role of language in intelligence. First, I will defend Dewey's account of the "the natural bases of inquiry" against Rorty's charge that it rests upon an implicit panpsychism. Second, I will contrast Dewey's account of the role of language in intelligence against Rorty's own discussion of this topic.

In *Experience and* Nature, Dewey says, "unless there is breach of historic and natural continuity, cognitive experience must originate within that of a non-cognitive sort" (EN: 29-30). He follows up on this claim in *Logic: The Theory of Inquiry* by laying out what he calls the "natural bases of inquiry." This discussion is intended to provide an account of how the behaviour of inquiry and, as I have argued, intelligent behaviour are continuous with organic behaviour more generally. Rorty takes Dewey to engage with this topic because he [Rorty] thinks that Dewey mistakenly believes that a causal, or evolutionary, account of our cognitive faculties can serve to justify some of our beliefs or ways of forming beliefs. Rorty claims that providing an account of intelligent behaviour in terms of more basic interactions between an organism and its environment leaves Dewey unable to sharply contrast intelligent from non-intelligent cases of behaviour. He claims that Dewey's emphasis on biological continuity;

> seems to shove the philosophically embarrassing discontinuity [i.e. between intelligent and unintelligent organisms] back down to the

> gap between, say, viruses and amoebas. But why stop there? Only giving something like experience to protein molecules, and perhaps eventually to quarks -- only a full-fledged panpsychism -- will eliminate such embarrassments (1998, 296).

Rorty contends that Dewey not only leaves himself with inadequate conceptual resources to distinguish intelligent behaviour from biological processes more generally; but that Dewey's account even leaves him without grounds for sharply distinguishing intelligent behaviour from physical or chemical processes. The problem that Rorty sees with a causal account of the emergence of intelligence, which he takes Dewey to be providing, is that we have to acknowledge that the chain of explanation continues past biology. To end one's account of how intelligent behaviour is continuous with other processes at the level of biology would be arbitrary. Thus, Dewey's seemingly genetic account of intelligence, found in his discussion of the "natural bases of inquiry", potentially implies panpsychism—an implicit commitment to the belief that not only organisms, but also physical matter exhibits some degree of psyche (mind) and therefore intelligence.

Before going into the details of Rorty's suggestion for how Dewey could have avoided this implication, I will briefly comment on his reading of Dewey's project. Although Rorty is correct to say that Dewey is concerned with describing the sense in which intelligent behaviour is continuous with other forms of organic behaviour, he is wrong to claim that this account confuses causality with justification. Although Dewey feels obliged to show that there is no radical explanatory gap between intelligent and other behaviour, this does not mean that by demonstrating such continuity he thereby establishes certain behaviours as more intelligent than others. He does not consider certain practices of inquiry to be established as more competent or justified simply by virtue of the fact that they are cases of organic behaviour. The justification for engaging in certain practices of inquiry over others cannot be

established through a causal account of how we came to inquire in certain ways. For Dewey, it is rather that certain practices of inquiry can be said to yield more warranted beliefs only to the extent that said methods have been demonstrated to resolve problematic situations, yield successful action, and provide results that facilitate future lines of investigation. The fact that inquiries are a form of organic behaviour does not enter into the justification for why we should engage in certain practices of inquiry over others. Having now clarified this aspect of Dewey's thought, I will return to Rorty's reading of Dewey in order to draw out further differences between their thought; namely, their respective accounts of the role of language in intelligence.

As a means of avoiding panpsychism, Rorty suggests that Dewey should have distinguished intelligent from non-intelligent behaviour (as well from cases of physical causation) on the basis of language use. According to Rorty, we do not need to go further than language in describing what is distinct about intelligent behaviour if we "construe[s] 'thinking' as simply the use of sentences" (1998, 298). If thought is understood in linguistic terms as "the ability to have and ascribe sentential attitudes," then mindedness and even the capacity for rationality can be considered distinctively linguistic abilities (298). This approach, Rorty claims, would provide the basis for Dewey to describe intelligence without introducing dualism, while simultaneously avoiding the unwanted commitment of panpsychism.

In contrast to Rorty's reading of Dewey, I have attempted to show in this thesis that Dewey does, in fact, identify the use of language to be an crucial element in what sets intelligent behaviour apart from other cases of organic interaction. This, however, does not mean that these two thinkers ultimately agree about the role of language in intelligence. There are significant differences, which I will now attend to

in order to draw out the uniqueness of Dewey's account.

In "Science as Solidarity", Richard Rorty describes two ways in which rationality can be understood (in this thesis I have employed Dewey's preferred term 'intelligence' to refer to what is normally considered rationality). First, Rorty claims, we can understand rationality as the ability to be methodical in our activities—to follow a procedure (35). Second is the notion of rationality that Rorty endorses, which he understands as "simply to discuss any topic – religious, literary, or scientific – in a way which eschews dogmatism, defensiveness, and righteous indignation" (1991, 37). This sense of rationality is the ability to engage with others in open dialogue. As Rorty understands the role of language in rationality, it is necessary for rationality as it is the means by which organisms can be rational in the sense of engaging others in open dialogue. There are two crucial differences between Rorty's account of the role of language in intelligence and the account Dewey provides, which I have sketched in this thesis; the notion of language involved in their respective discussions, and their respective understandings of intelligence (or rationality). I will discuss these in turn.

For Dewey, the role of speech in intelligence is not as a medium for conversation but is rather as another tool that can serve purposes of inquiry. Abstract symbols can be employed in reflection upon our habits and therefore serve as a means for facilitating their development. However, as I described in my second chapter with respect to his account of reasoning, for Dewey this activity can take the form of not only sentence-use, but can also include activities such as building and running computer simulations. Reasoning, he claims, involves deliberating about possible courses of actions via the meanings of objects, where 'meaning' is understood in the broad sense as equally applicable to words, objects, or even natural events. Dewey

understands language in this broad sense as the use of any meaningful object, whether sounds, artifacts, or natural occurrences and it is in this sense that he identifies language as crucial to intelligence.

Dewey thinks that the capacity for speech is insufficient for rationality or intelligence. For example, although children use language, this does not imply that they necessarily engage in intelligent behaviour. Their ability to engage others in conversation does not imply that children engage in the deliberate test of their beliefs through inquiry. Dewey instead identifies language as being of relevance to intelligent behaviour in the broader sense as the use of meaningful objects. However, even in this broader sense, he does not see language as sufficient for intelligence, as intelligence requires that the meanings of objects be subject to critical scrutiny and development through inquiry.

Larry Hickman (2007) elaborates the importance language plays in Dewey's account of intelligence. "For Dewey," he says, "the principal difference between human beings and nature is not human communities' unique powers of communication, but human beings' unique ability to control their own habit formation and consequently alter their own evolution and the evolution of their environing conditions" (132). This is to say that what distinguishes humans from other organisms is our capacity to engage in inquiry—to deliberately subject our habits to scrutiny and develop new habits through this process. While Hickman is at risk of overlooking the intimate connection that Dewey sees between communication and the control of one's habits, he is correct in stating that for Dewey (unlike Rorty) the importance of language for intelligent behaviour does not lie solely in the establishment of communication. When objects are meaningful—when rules for their use and interpretation have been established—our ways of interacting with events can

become subject to deliberate and systematic scrutiny and therefore serve as the basis for intelligent action. It is in this sense that Dewey takes language to be central to his account of intelligence.

For Dewey, no amount of conversation, dialogue, or proficiency in argumentation is sufficient for replacing the role of the experimental method in intelligent behaviour—the systematic and deliberate development of habits through inquiry. To understand rationality or intelligence on the model of conversation is, for him, to overlook the importance of engaging with the world, not just other people. This, however, is not to say that Dewey is endorsing the first sense in which Rorty describes rationality. No less than Rorty, Dewey rejects the notion of rationality as procedural because an organism is only intelligent to the extent that it can critically examine its habits. By contrast, an organism is unintelligent to the extent that it blindly acts upon its habits or follows a procedure, even one so well established as the scientific method.

4. Conclusion

In this chapter I discussed Dewey's identification of the scientific method as the method of intelligence. Having in the last chapter described inquiry as the means by which an organism exerts control over its habits, I explored his claim that scientific inquiries are exemplary cases of inquiry. As he understands the scientific method, it is primarily a method for critiquing, forming, and warranting beliefs.

While the use of this method is most explicit in the fields ordinarily considered the sciences, such as physics and biology, Dewey does not take its relevance to be limited to these subject matters. His discussion of scientific inquiry is primarily normative—an account of what makes certain practices of inquiry more

effective than others for developing knowledge and yielding beliefs that are stable in the face of critical scrutiny. As such, his discussion of scientific inquiry is intended as a discussion of how inquiries should be conducted regardless of field. As with other techniques such as farming, he thinks that we can empirically investigate whether some methods of inquiry are superior to others, as well as explore what factors are involved in their success. He views the formation of beliefs through hypothesis and deliberate experimental test to simply be a superior method for forming and testing beliefs than other means—e.g. activities lacking systematic experiment. In competent inquiry not only do results have the status of hypotheses, but also the methods employed in inquiry are subject to critical and deliberate development. The method of science, for him, exemplifies intelligent belief formation—so far as present knowledge suggests.

I concluded by contrasting my understanding of Dewey with that of Richard Rorty in order to emphasize the distinctiveness of Dewey's account of the role of language in intelligence in contrast to Rorty's view. While Rorty suggests that intelligent creatures can be demarcated from non-intelligent ones on the basis of speech, for Dewey this ground is insufficient. The sense in which Dewey takes language to be involved in intelligent behaviour is in a sense wider than speech. For him, language refers to the interaction with and use of objects, not only words, in virtue of their meaning. Contrary to Rorty's contention that Dewey place inadequate emphasis upon the importance of language (here understood as speech), Dewey's view is that even in cases where speech is involved in inquiry, the mastery of sentences and arguments alone remain insufficient for such behaviour to be intelligently conducted. For him, intelligent behaviour is rather behaviour that is carried out on the basis of knowledge that has been warranted through properly

conducted inquiry. Although the use of symbols—meaningful objects—enters into this behaviour, such behaviour is not identical with inquiry.

CONCLUSION

In the first part of *Logic: The Theory of Inquiry* Dewey discusses what he calls the "Existential Matrix of Inquiry." The purpose of these chapters is to develop the claim that biological and, in particular, cultural factors play a necessary role in inquiry as well as in intelligent behaviour more generally. In this thesis I explore his account of the natural bases of inquiry as an attempt to show how intelligent behaviour is continuous with, as well as a special case of organic behaviour more generally conceived. These chapters form the basis of my thesis as I argue that Dewey's account of language, in particular, plays a crucial role in his account of inquiry as well as intelligent behaviour.

For Dewey, intelligent behaviour is to be contrasted with behaviour that is the result of unthinking habit. For most organisms, he claims, habits are formed unconsciously through their interactions with their physical environment, e.g. hunting, eating, or securing shelter. However, he thinks that through communication the possibility is opened up for organisms to play an active role in the formation of their behaviour. He says, "apart from communication habit-forming wears grooves; behaviour is confined to channels established by prior behaviour" (EN: 214).

Although Dewey identifies language as being of particular importance for intelligent behaviour, it must be kept in mind that in this context he discusses language in a very wide sense. Language, for him, includes behaviours such as speech and writing, but he also thinks language can be understood in a sense that includes the use of artifacts and even natural occurrences for purposive action. For him the heart of language is communication and communication, he claims, endows objects with meaning—rules for their use and interpretation. The use of artifacts and

the use of sound in speech he sees as similar forms of behaviour as both involve the use of objects as symbols—i.e. as meaningful objects for which habits or behaviours have been established as appropriate.

Dewey maintains that linguistic behaviour—the use of symbols in this wide sense—enables 'higher' organisms to refine and develop their habits. "Without [symbols]" he says, "no intellectual advance is possible; with them, there is no limit set to intellectual development except inherent stupidity" (QC: 121). For example, the occurrence of pain functions as a symbol to the extent that it is a meaningful occurrence—i.e. it calls for certain responses such as taking aspirin. By understanding and responding to phenomena in virtue of their meanings, our behaviour with respect to the pain comes to have implications for further habits such as avoiding bright lights or even visiting a doctor.

On its own, however, for Dewey the use of meaningful objects is not sufficient for an organism's behaviour to be considered intelligent. This position stands in stark contrast to Richard Rorty, who suggests that we can understand rationality in terms of open conversation—the ability to "discuss any topic – religious, literary, or scientific – in a way which eschews dogmatism, defensiveness, and righteous indignation" (1991: 37). By contrast, Dewey understands intelligence as requiring critical experimentation. He says, "[inquiry] is not identical with the mere fact that one thing indicates, means, another thing" (LW8: 120). For example, we do not inquire if we take for granted that the occurrence of pain calls for aspirin as a response. Inquiry rather requires that an organism determine through experimental methods whether a given response to pain is warranted. Inquiry is a critical use of symbols—the deliberate scrutiny of "the reliability, the worth, of any particular indication [i.e. meaning]" (20). Insofar as inquiries, for Dewey, involve the capacity for an organism

to use symbols, he therefore considers it a case of linguistic behaviour in its widest sense.

As the behaviour involved in inquiry involves the critical development of meanings—rules of behaviour—inquiry is a necessary element in Dewey's account of intelligent behaviour. In fact, for him the distinction between intelligent and non-intelligent animals can be seen as the difference between those who engage in inquiry, and those who do not—i.e. this distinction is the difference between organisms that play an active role in their habit formation and those that lack this capacity. Although inquiry is a necessary condition for behaviour to be intelligent, it should be noted that it is not exhaustive of intelligent behaviour. Inquiry is a factor in intelligence insofar as it leads to behaviour involving critically adopted habits.

Under certain conditions, inquiries, too, might also be considered cases of intelligent behaviour. Dewey consider inquiries that follow the scientific model of hypothesis and experimental verification, for example, to be cases of intelligent behaviour insofar as the behaviour involved in such inquiries is carried out on the basis of critical scrutiny which determined if these habits (methods of inquiry) achieve their desired end of warranted beliefs. For this reason, I discussed Dewey's account of scientific inquiries, which he views to be exemplary of intelligent belief formation. As scientific inquiries are a particular case of inquiry, language also plays a role in this behaviour. However, for Dewey inquiries that are distinctively scientific are those in which symbols and meanings are most systematically and deliberately developed and thus provide the basis for intelligent action. He identifies the method of science as the method of intelligence because it is the best means available for humans to play an active role in forming their own habits and it therefore provides a basis for intelligent action.

For Dewey, behaviour that is informed by or carried out on the basis of systematic inquiry is intelligent. As he contrasts intelligent behaviour with behaviour that is routine, the method of science exemplifies intelligent behaviour because it is the best means available for an organism to systematically and experimentally develop its habits—its routine forms of behaviour. In inquiry this takes the form of a systematic and critical scrutiny and subsequent development of the meaning of events—i.e. their worth as symbols. As the capacity for language is crucial for an organism to exert control over its habit formation through inquiry, Dewey takes language to play a key role in intelligent behaviour more generally.

APPENDIX:

ABBREVIATIONS FOR REFERENCES TO JOHN DEWEY'S WORK

The references to John Dewey's work in this thesis are to the critical edition of published by Southern Illinois University Press: Carbondale and Edwardsville and edited by Jo Ann Boydston, *The Collected Works of John Dewey, 1882-1953.* References are made to the series edition followed by volume and page number. (MW9: 281) refers to page 281 of the ninth volume of the Middle Works.

EW *The Collected Works of John Dewey: The Early Works, 1882-1898.* 5 Volumes. ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press.

MW *The Collected Works of John Dewey: The Middle Works, 1899-1924.* 15 Volumes. ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press.

LW *The Collected Works of John Dewey: The Later Works, 1925-1953.* 17 Volumes. ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press.

In addition to these standard references, I have also used the following abbreviations;

EN *Experience and Nature. The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 1,* ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press, 1988.

QC *The Quest for Certainty. The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 4,* ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press, 1990.

LTI *Logic: The Theory of Inquiry. The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 12,* ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press, 1991.

BIBLIOGRAPHY

1] Works by John Dewey

Dewey, John. "An Analysis of Reflective Thought." In *The Collected Works of John Dewey: The Middle Works, 1899-1924. Vol. 13,* ed. Jo Ann Boydston. 61-71. Carbondale, IL: Southern Illinois University Press, 1976.

———. "Beliefs and Existences." In *The Collected Works of John Dewey: The Middle Works, 1899-1924. Vol. 3,* ed. Jo Ann Boydston. 83-100. Carbondale, IL: Southern Illinois University Press, 1976.

———. *Experience and Nature. The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 1,* ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press, 1988.

———. "The Experimental Theory of Knowledge." In *The Collected Works of John Dewey: The Middle Works, 1899-1924. Vol. 3,* ed. Jo Ann Boydston. 107-127. Carbondale, IL: Southern Illinois University Press, 1976.

———. "Intellectual and Practical Studies." In *The Collected Works of John Dewey: The Middle Works, 1899-1924. Vol. 9,* ed. Jo Ann Boydston. 271-285. Carbondale, IL: Southern Illinois University Press, 1976.

———. "Language and the training of thought." In *The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 8,* ed. Jo Ann Boydston. 301-314. Carbondale, IL: Southern Illinois University Press, 1981.

———. *Logic: The Theory of Inquiry. The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 12,* ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press, 1991.

———. "The Nature of Deliberation." In *The Collected Works of John Dewey: The Middle Works, 1899-1924.* Vol. 14, ed. Jo Ann Boydston. 132-138. Carbondale, IL: Southern Illinois University Press, 1976.

———. *The Quest for Certainty. The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 4,* ed. Jo Ann Boydston. Carbondale, IL: Southern Illinois University Press, 1990.

———. "What is Thinking?" In *The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 8,* ed. Jo Ann Boydston. 113-124. Carbondale, IL: Southern Illinois University Press, 1981.

2] Secondary Texts

Alexander, Thomas. *John Dewey's Theory of Art, Experience & Nature: The Horizons of Feeling*, Albany, NY: State University of New York Press, 1987.

Black, Max. "Dewey's Philosophy of Language." In *The Journal of Philosophy*. Vol. 59, No. 19. 505-523. 1962.

Hickman, Larry. *Pragmatism as Post-Postmodernism: Lessons from John Dewey*. New York: Fordham University Press, 2007.

Kadlec, Alison. "The Epistemology of Critical Pragmatism." In *Dewey's Critical Pragmatism,*" 11-33. New York: Lexington Books, 2007.

Kaufmann, Felix. "John Dewey's Theory of Inquiry." In *John Dewey: Philosopher of Science and Freedom*. ed. Sidney Hook, 217-229. New York: Barnes and Noble, 1950.

Kennedy, Gail. "Dewey's Logic and Theory of Knowledge." In *Guide To the Works of John Dewey*. ed. Jo Ann Boydston. 61-98. Carbondale, IL: Southern Illinois University Press, 1972.

Kindred, Paola. *Continuity, Inquiry, and the Possibility of Wisdom in John Dewey's Pragmatism*. PhD diss. University of Illinois at Chicago, 2001.

Rorty, Richard. "Dewey Between Hegel and Darwin." In *Pragmatism, Truth and Progress*. 290-306. Cambridge University Press, 1998.

————. "Introduction." In *The Collected Works of John Dewey: The Later Works, 1925-1953. Vol. 8,* ed. Jo Ann Boydston. ix-xviii. Carbondale, IL: Southern Illinois University Press, 1981.

————. "Science as Solidarity." In *Objectivity, Relativism, and Truth*. 35-45. Cambridge University Press, 1991.

Weinpahl, Paul. "Dewey's Theory of Language and Meaning" In *John Dewey: Philosopher of Science and Freedom*. ed. Sidney Hook. 271-288. New York: Barnes and Noble, 1967.

Wilson, Daniel. "Fertile Ground: Pragmatism, Science, and Logical Positivism." In Pragmatism: From Progressivism to Post-Modernism. eds. Robert Hollinger & David Depew. 122-141. Westport, CT: Praeger Publishers, 1995.