

WHAT ARE SKILLS? SOME FUNDAMENTAL REFLECTIONS

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Abstract: When the concept of 'skill' is used in reading and writing research or more generally in linguistic research, it is rarely made the subject of detailed and precise definitions or reflections. The present article is a theoretical contribution that consists mainly in reflections on the type of phenomenon that 'skill' represents. Philosophically, the account is based above all on Aristotle's views, according to which 'skill' is characterised as a potentiality. Psychologically, this article expresses the opinion that the only way to describe, understand and explain 'skill' is by combining behaviourism and cognitivism.

Keywords: Behaviourism, Cognitive Psychology, Skill, Automaticity, Awareness, Potentiality, Tacit Knowledge, Linguistic Meaning

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1. CHALLENGES

1.0 Background and goals

1.1 Behaviourism and cognitive psychology have been two of the most influential schools in psychology in the past 40 or 50 years. In many ways they have been polar opposites and mutually exclusive. As an introduction I will examine the consequences of employing these disparate schools strictly and consistently. (In practice, researchers usually do not do this; most research being done mixes in some of the notions from the other camp. But this type of eclecticism is often more problematic than 'pure' models. Here I have chosen to use pure models primarily to make my line of argument easier to follow.) The reflections presented below have emerged from my work in reading research, but I would contend that they are also relevant to a number of other fields of research within psychology, education and linguistics.

1.2 The aims of this article are (1) to focus on the fundamental problems of reading research; (2) to problematise the dominant position achieved by cognitive psychology in reading research; and (3) to call attention to the fact that the concept of 'skill' needs to be more closely defined and assigned a more prominent position in reading research. I will try to determine the philosophical status of 'skill' and try to define 'skill' by combining key concepts from both cognitive psychology and behaviourism.

2. PROBLEMS

2.0 Behaviourism ad absurdum

2.1 Behaviourism deals exclusively with observable behaviour (Watson, 1930). It is useful for describing associations between observed stimuli and observed responses in humans and in animals. It cannot, however, explain the messy deviations in our behaviour that are the result of our cognition or will. Moreover, this school of psychology cannot describe, much less explain, 'inner' phenomena such as doing sums in your head. If we exclusively base our science on observed behaviour, we will have to admit that there is quite a gap between the task someone is to perform and the solution he or she finds. For example: A voter in an election has to decide whether or not the promises the various candidates give during their campaigns are believable or not. Basing his or her vote on the candidates' observable behaviour alone would not be wise. A psychology that excludes non-observable entities such as thoughts and feelings will be a vastly limited science.

2.2 The principle of association between stimulus and response is fundamental to behaviourism's theory of learning. To create strong and lasting associations, repetition is necessary. The term 'overlearning' is used for when we continue with repetitions past the point when stable associations are established. Behaviouristic theories of learning do not traffic in notions such as 'understanding' (Leahey, 2001).

2.3 Heartbeats and breathing are for the most part automatised (that is, they take place without learning, but we can learn to regulate them somewhat). The term 'habit' is used for actions we learn to perform. Habits are basic elements in behaviour-

ism. But we should also note that habits can be affected consciously; we can change them by intellect and will. From this we may conclude that behaviourism alone is not sufficient for explaining all psychological phenomena.

3.0 Cognitivism ad absurdum

3.1 In cognitive psychology all attention is directed towards the ‘inner’ life (von Eckardt, 1993; Gardner, 1985). Traditionally this school focuses on ‘thought’ and ‘awareness’. These terms, however, are unclear. Nor is it clear how thoughts, being very subjective things, can be studied. What are the ‘causes’ of our thoughts?

3.2 Behaviourism, as mentioned, uses overlearning in order to secure the best possible learning. For example, overlearning is a technique often used with dyslexics. Despite the fact that some cognitive psychologists and educators use this technique, it must be pointed out that this concept has no basis in their theory of learning; it belongs in the school of behaviourism. A pure cognitivist would have to employ cognitive techniques in working with dyslexics. The cognitive solution to dyslexia is cognition of cognition: metacognition (Gombert, 1992).

3.3 Metacognition makes great demands on intellectual ability and awareness – even for people without learning difficulties. An example: There is a widespread consensus that dyslexics have difficulties identifying and distinguishing phonemes. They thus also have difficulty forming correct associations between phonemes and graphemes. However, explaining this to dyslexics using metacognition is no easy task. In fact, it is somewhat akin to using intellectual reasoning to explain to a colour-blind person what colours are. Moreover, there is a question as to what is meant by this ‘metacognition’ (and by similar expressions such as ‘awareness of awareness’). A subject cannot simultaneously be an object. An eye cannot see itself. Metacognition, as it is currently conceived, cannot be studied scientifically, nor can it be taught.

3.4 Assuring the quality of one’s metacognition would require meta-metacognition. Assuring the quality of that would require meta-meta-metacognition – and so on, in an infinite sequence of ever more ‘metas’.

3.5 In the real world there are no thoughts that are entirely unaffected by feelings, urges and sudden insights. This is an important reason for why a pure cognitivism is indefensible. Another problem with pure cognitivism is its inability to explain why we ‘choose’ one thought over another. The history of science shows that new ideas or discoveries often are arrived at by irrational routes (Kuhn, 1962). This can only be explained by granting some efficacy to feelings, urges and sudden insights. The same is true when we try to explain *mistakes* in reasoning and *learning difficulties*.

3.6 The problems involved with using the concept of metacognition to explain how the mind works do not collide with the obvious fact that we do monitor our own mental activities. Even if we cannot observe our mental activities while they are taking place, we can observe their *results*. Aquinas claims that ‘the soul is known by its acts. For a man perceives that he has a soul and lives and exists by the fact that he perceives that he senses and understands and performs other vital operations of this kind [...] No one perceives that he understands except through the fact that he understands something, for to understand something is prior to understanding that one understands.’ (*De veritate*, 10, 8, Thomas Aquinas).

3.7 Cognitive psychology has often employed flow charts that illustrate the ‘normal’ paths followed in solving cognitive problems (Reber, 1985). The dual-route model of reading is an example (Coltheart, 2005). There has been disagreement about the usefulness of this model for describing, understanding and explaining ‘normal’ reading and reading difficulties; cf., e.g., Coltheart, 2006). Is this model best conceived of as a ‘summary’ of how people read? Is it a hypothesis about what happens at the neurological level or at the psychological level? Perhaps the most obvious way of understanding this model is to view it as a description of what is *meant* by ‘reading’; that is, as a *definition* – more precisely, a *normative* definition that points out the necessary components of adequate reading. In such definitions there are more or less explicit conditions on what is ‘normal’ or effective reading. To the extent that these conditions are correct, ‘flow charts’ with their different ‘boxes’ may show us, for example, what ‘subtasks’ create problems for dyslexics. In this way they may contribute to a more precise diagnosis of dyslexia. Flow charts, however, do not give an overview of the *causes* behind the putative fact that reading takes place in a particular way. Nor do they give us any explanation as to how or why a particular instance of a person’s reading is influenced by the situation or trial conditions. It should also be noted that flow charts do not give explanations as to how reading ability is developed. Therefore they do not tell us how to help poor readers. We have to know something about feelings, urges, habits, environmental factors and the like in order to understand how and why individual variations in reading ability (and in particular instances of reading) occur. Neurology, behaviourism and connectionism will provide more insight here than cognitive psychology.

3. SOLUTIONS

4.0 A realistic psychology

4.1 It must be concluded that pure behaviourism and pure cognitivism both lead to unreasonable consequences. An eclectic mix of the two is equally problematic. In the real world, body and mind make up a unified whole – but not a mixture. It is not so much the case that we *have* a body and a mind, but that we *are* both body and mind.

4.2 Models that simply assume an interaction between the biological/neurological substrate and cognition are riddled with the same problems that Descartes’ *dualism* faced (cf., e.g., Frith & Blakemore, 2005).

4.3 The best hypotheses in this area are those developed by connectionism. Connectionism assumes as a starting point that there is no essential difference between the cognitive level and the neurological/biological level (Bechtel & Abrahamson, 1991).

4.4 One objection to connectionism, however, is that it hides the differences between the ‘outer’ and the ‘inner’ of mental acts. Ludwig Wittgenstein claimed that ‘the human body is the best picture of the human soul [...]’ (Wittgenstein, 1953, II, iv, 178). He argued that (1) we have a consciousness that cannot be observed by others; and (2) mental activity cannot be taken as the *cause* of observable behaviour. He claimed, for example, that when you see someone ‘break out in joy’, their observable behaviour is a *criterion* or a hallmark of their inner joyful feeling. (Witt-

genstein, 1953, §580). This is to say that both the mental and the physical aspects are part of the definition of 'joy'. A metaphor for this would be a mountain-top with two sides. Neither side can be said to *cause* the other. When we have seen both sides of the mountain, we can identify it more precisely and confidently than if we had only seen one side of it. Even if a mountain-top has several sides, we may use only one name for referring to the top. Similarly, the single term 'man' may refer to both an outer and an inner 'side'. Brain-imaging and other studies have given us much new knowledge about the brain, but the relationship between the mind and the brain as well as the definitions of, say, 'skills' or 'intelligence' are primarily philosophical problems and tasks that cannot be solved by means of brain imaging; cf., e.g., Brook & Mandik (2004).

4.5 Letting this notion of a mountain-top inform our thinking further, we can say that the relationship between the mental and the physical aspects of something, that is, between the 'inner' and 'outer' aspects of it, is like the relationship between a conceptual definition and an operational definition. The notion of 'intelligence', for example, can be operationalised by defining it as the score achieved on a certain test. Yet according to this way of thinking, we cannot say that the subject's intelligence *caused* him or her to achieve that score. It is often claimed that an operational definition is *logically deduced* from a conceptual definition. But it is not possible to *deduce* outer, physical manifestations from inner, mental activity. Rather, these phenomena are complementary; they shed light upon each other. In order to understand what is meant by, for example, 'reading', it is necessary to take into consideration both the outer, physical aspects and the inner, mental ones. Only when the phenomenon 'reading' is determined in both perspectives can we begin to look at causal relationships.

5.0 What are skills?

5.1 Just as a human being is a unique combination of mind and body, both of these aspects are reflected in the term 'skill'. In order to understand this term, we do well to look to Aristotle's philosophy. On the one hand, Aristotle disagreed with the materialists and the determinists, who claimed that all of our actions are the product of inherited factors and the pressures of the environment (nature *and* nurture). On the other hand, he rejected the claims of Socrates and Plato that as long as we *think* correctly, we will also *act* correctly. For them, a true philosopher is one who has clear and true thoughts; as such, he will also be a morally good person. Aristotle considered that Socrates and Plato put too much store in the power of thought in daily life. He held that intelligence and knowledge alone were not sufficient to lead a person to act in accordance with moral norms. In the real world, our actions are often somewhat 'distorted' by feelings and bad influences. We need therefore to *practice* 'acting good' – but not as a 'mechanical' habit. On the contrary: we need to both follow general rules and at the same time take into consideration that which is unique in each situation. We acquire an *attitude or disposition* and thereby become virtuous (cf. Thomas Aquinas' (2006) distinctions between 'potentiae' and 'habitus' in *Summa Theologiae*, vol. 22, Ia2ae. 49–54).

5.2 Regarding the acquisition of skills, Aristotle writes: ‘of all the things that come to us by nature we first acquire the potentiality and later exhibit the activity (this is plain in the case of the senses; for it was not by often seeing or often hearing that we got the senses, but on the contrary, we had them before we used them, and did not come to have them by using them); but the virtues we get by first exercising them, as also happens in the case of the arts as well. For the things we have to learn before we can do them, we learn by doing them, e.g. men become builders by building and lyre players by playing the lyre; so too we become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts.’ (Aristotle, 1934, 1103a26–1103b2). To this it should be added that skills are not unchangeable, even though they are more stable than the particular instances of their being performed. There is always the possibility that they will improve or degenerate.

5.3 In the language of today – and with the greatest possibility for empirical measurement – we can say that skills are combinations of automaticity and awareness (i.e. conscious monitoring and possible correction in the performance of the task). There are varying degrees of automatising and conscious monitoring. The combination of these two ways of performing tasks will vary according to the type of task being performed, the purpose of the task, etc. Developing a skill entails developing an automatising, the ability to consciously monitor one’s performance, and the ability to combine these in productive ways.

5.4 We can have a great deal of knowledge about the physical laws pertaining to how bodies float on water but still not be able to swim. Aristotle’s dictum on practice is valid here. Bicycling is another skill that is developed through practice. A high degree of automatising is necessary. If you think too much about the whys and hows of balancing on two wheels, you will fall. But if you bicycle too much on autopilot, you will not be able to tackle unexpected situations in a flexible manner. We cannot say, however, that a skill is awareness + automaticity. Rather, it is the most situationally appropriate combination thereof. These two aspects form a unified whole – just as mind and body are a unified whole. A tightrope-walker, for example, is not a person who in addition to performing certain movements on a tightrope *also* has a certain awareness of these actions. As mentioned, both the ‘inner’ (mental) and the ‘outer’ (physical) aspects of a skill are part of the definition of that skill. Therefore, when cognitive psychology puts much weight on identifying and performing ‘sub-skills’, this may create more problems than it solves. From a logical point of view it may be clarifying to split reading into its smallest, atomic units. From a psychological and educational point of view, by contrast, it may be extremely challenging. Some people will find the subject too abstract. Others will find it difficult to shift in a natural way between parts and the whole – as it were, between the trees and the wood.

5.5 It is important to note that the relationship among sub-skills is *definitory*, that is, logical and not empirical. We can illustrate this with the following example: (a) a judge is a person who, on behalf of the state and in accordance with the law, pronounces verdicts in court cases; and (b) there are a number of laws and rules that *define* what tasks this entails in practice. We can say that (a) is equivalent to the skill, while (b) is equivalent to sub-skills. Both (a) and (b) are parts of the *definition* of ‘judge’. The question of how the judge *ought to*, say, treat the prosecutor and the

defence counsel cannot be answered empirically, by looking at how judges actually perform. The answer must be found in the definitions and rules regulating the judge's activities. Similarly, it is a commonplace to *define* 'reading' as a skill which includes sub-skills such as comprehension and phonological analysis and synthesis. If we lay down categorical definitions of concepts such as 'reading' or 'dyslexia', we thereby exclude them from empirical research and insulate them from change. In my opinion, all definitions must be perceived and treated as hypotheses in need of adjustment as and when empirical research so requires (cf. Tønnessen, 1997).

5.6 In addition to reading, important examples of skills are intelligence and language skills. Often skills are conceived of and referred to as if they were delimited and localised entities (e.g., in Jerry Fodor's modular theory of mind: Fodor, 1983). Hypostatizing or substantiating in this manner is misleading. Just as the fragility of a glass surface is both nowhere to be found in the glass itself and everywhere in it, we cannot localise skills. Even though you are in Norway, it makes no sense to conceive of your reading ability as also being in Norway ... However, we can describe the conditions *necessary* for reading, such as awareness, certain linguistic skills, vision, etc.

5.7 We need to be clear about the difference between 'skill' and the 'performance' or actualisation of a skill. Even though a skill changes over time, it is still more stable than the actualisations of it. This is important to take into consideration when diagnosing and treating reading disabilities. Actual instances of reading are highly influenced by motivation, concentration, the reading situation and the like. To the extent that a person's reading difficulties are due to such circumstances, efforts should be made to improve them. Doing so will usually be easier than trying to improve the skill itself.

6.0 How do we learn skills?

6.1 The expression 'tacit knowledge' is often associated with Michael Polanyi (1973). He expressed his basic point in the sentence: 'We know more than we can tell.' We see this clearly in practical skills such as swimming, bicycling and the like. We are not able to acquire these skills through reading or hearing about them, and we cannot explain them fully to another person with words alone. This is not because of any lack of verbal ability; it is because these skills are not about 'knowledge' in the usual sense (cf. Wittgenstein, 1922, 4.1212: 'What *can* be shown, *cannot* be said.'). They are 'knowing how', not 'knowing that'. Another term for 'knowing how' is 'procedural knowledge' – or 'tacit knowledge'. Procedural or tacit knowledge is not about following rules. It is more apt to say that the activity in question is *in accordance with* rules, not that the person exhibiting the skill is *following* rules intentionally and fully consciously. Often we can only claim that there is a *regularity or pattern* in the activity.

6.2 Even though we cannot describe precisely the regularity or patterns in a complex activity (such as swimming or riding a bicycle), our consciousness can nonetheless be trained to monitor these activities and take over control of them in some circumstances. Control and correction such as this makes the difference between, say, a good and a poor pianist. This is typical of all kinds of skills.

6.3 Even though skills cannot be learned through theoretical teaching alone, not all such teaching is worthless. Learning through examples – seeing the behaviour modelled – is also important. Skills are primarily acquired through ‘implicit learning’ and practice (Reber, 1993).

7.0 Potentiality and language

7.1 Like other skills, language skill is a kind of potentiality. For example, when we are asleep, our entire language skill exists only as a potentiality. When we are awake, we may use parts of it while other parts exist only as potentialities. Moreover, language is primarily a skill, not a system as claimed by Chomsky (1957; 2006) and others. Language can only be studied through speech acts – as realisations of language skills. By means of empirical methods we may find regularities and patterns in language performance at various times and places. We cannot, however, use the term ‘system’ in the same meaning as it has in relation to, say, carefully constructed philosophical systems. Regularities and patterns in language performance are subject to continuous change. Grammar as a scientific discipline consists of empirically based generalisations with limited scope. Politicians, authors, teachers and others may use those generalisations to formulate normative recommendations about how to use language in order to obtain specific goals when it comes to expressing thoughts and feelings, but it must be questioned to what extent such recommendations can be seen as empirically based.

7.2 The concept of ‘potentiality’ is also necessary in defining *linguistic meaning*. Plato claimed that concepts or ideas were located in an unchanging ‘realm of ideas’. According to this way of thinking, we label a person a ‘human’ because he or she exhibits characteristics that are in accord with the unchanging definition. During the Middle Ages this notion of ‘conceptual realism’ was criticised by the ‘nominalists’, who claimed that only particular instances existed. Both ways of looking at things reduce potentiality to actuality – to either abstract *ideas* or concrete (spoken or written) *words*.

7.3 An alternative solution is to look at words as *variables*. In mathematics, a variable is something that has a value within a certain range. For example, we can say that x is a variable within the *range* of whole numbers from 5 to 11. The seven numbers 5, 6, 7, 8, 9, 10 and 11 then form a set. At any one time, x can have only one of these values (thus, in a sense, the nominalists are correct). But it must be added that x can *potentially* have any of the seven values. By adding the notion of ‘potentiality’ we assume a middle stance between the conceptual realists and the nominalists. We can illustrate this point by using the word ‘man’ as an example. Among the potential meanings of this word we find: (a) ‘an adult male human being’, (b) ‘a human being of either sex’, (c) ‘the human race’ and (d) ‘a husband’. The word potentially has all these – and other – meanings, but it has only one meaning at a time. It should also be added that grammatical moods are one part of the potentials of meaning. The word ‘help’ may for example be used in an indicative mood (‘Paul needs help.’), in an imperative mood (‘Help!’) or as a question (‘Does Paul need help?’). The possible meanings (and moods) taken together delimit the range of the word – just like a giv-

en set of numbers delimits the possible values of a variable. Contexts, situations, persons, etc., determine which of the potential meanings is actualised.

7.4 Empirical studies are necessary to delimit these fields of meaning. Meaning is a potential that signs (codes, symbols, etc.) ‘have’. How this potential is realised depends on the person, intention, situation, etc. Empirical investigation must be based on physical reactions elicited by speech acts, and on interpretations of those reactions. The goal of empirical investigations is to obtain descriptions, definitions, explanations and understanding. As mentioned above, meaning involves both ‘outer’ and ‘inner’ aspects. Based on investigations of reactions we may formulate hypotheses of meaning, although we will never attain exhaustive and unchangeable definitions. There are usually several sets of possible realisations of potentials for meaning. These, however, are not as clearly defined as in mathematics. They are more like magnetic fields, where at the centre we find the most common meanings. A field of possible meanings can also change over time and place. In studies of the type referred to here it is not useful to draw sharp lines between semantics, pragmatics and hermeneutics. A certain meaning cannot be localised to a certain element in the overall linguistic code or string of signs, nor to the non-linguistic context. Attempting to localise exactly where the meaning arises in, say, a poem or other ‘message’ is as impossible as localising where the fragility of a glass surface ‘is’: it is everywhere and nowhere.

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