

## DISPOSITIONS

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### Abstract

It is common in psychiatry and other sciences to describe an individual or a type of individual in terms of its disposition to manifest specific effects in a particular range of circumstances. According to one understanding, dispositions are statistical regularities of an individual or type of individual in specific circumstances. According to another understanding, dispositions are properties of individuals in virtue of which such regularities hold. This entry considers a number of ways of making each of these senses of disposition more precise while discussing a number of dangers lurking in careless use of the concept of a disposition.

### 1. TWO SENSES OF DISPOSITION

It is common in psychiatry and other sciences to describe an individual or a type of individual in terms of the individual's disposition to manifest specific effects in a particular range of circumstances. To say that sugar is soluble is to assert that it has a disposition to dissolve when placed in water. To say that Rahul is extroverted is to assert that he is disposed to be assertive, talkative, and gregarious in social settings. What does it mean for an individual to have a disposition?

The term disposition is often used synonymously with words such as propensity, proclivity, and tendency, to assert something about the *regularity* or probability with which an individual manifests an effect relative to another individual or sub-group. In the simple cases, one asserts that the individual (a cube of sugar) would manifest the effect (dissolve) were it placed in the relevant conditions (in water) whereas other individuals (an aluminum cube) would not manifest the effect in the same conditions. In more complex cases, the disposition might simply be a partition among individuals with respect either to the probability or the magnitude with which they manifest the effect in the relevant circumstances. An extrovert might be more likely to interact with others than introverts, to interact with them more intensely than do introverts, or both.

The term disposition is also often used to assert of an individual that the individual has a property or set of properties in virtue of which the individual manifests the effects that it does, when it does, and to the extent that it does. This sense of disposition is roughly synonymous with terms such as *trait*, character, and personality type. To have a disposition is not, or at least not merely, a statistical fact about the frequency or intensity with which an individual or group exhibits an effect in a set of circumstances. Rather it is a feature of the individual that explains why the individual exhibits the behavior or statistical frequency in question. On this view, sugar dissolves because it is soluble and Rahul is gregarious because he is extroverted.

These common-sense ideas about dispositions (as regularities and as traits) are difficult to maintain upon closer investigation of ordinary examples of dispositions in science and every-day life. Though there is not at the moment a generally accepted philosophical theory of dispositions (Choi & Fara, 2012), there are

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a range of problems and desiderata that any acceptable theory of dispositions must address.

## 2. MOLIERE'S PROBLEM

In *Le malade imaginaire*, Moliere imagines a comical physician explaining that opium makes people sleepy because it contains a *virtus dormitiva* or dormitive virtue; today we say opium is soporific or somniferous. If one holds that a disposition just is a regularity between the relevant conditions and the manifestations of the disposition (the regularity sense) then the disposition cannot play the explanatory role assigned to it in the trait sense of dispositions. For if dormitivity simply is the regularity that people who use opium tend to sleep more than those who do not, then having the dormitive disposition just is, and so cannot explain, the fact that people who use opium tend to fall asleep. Similarly, if extroversion just is a statistical fact about the frequency and intensity with which individuals of a given type interact in social settings, then extroversion just is, and cannot explain, that statistical fact.

If the behavior of an individual or a group in a set of circumstances can be explained by their having a given disposition, then there must be more to having a disposition than merely displaying that statistical regularity. Opium's dormitive powers, for example, follow from its molecular structure and its relation to the structure of human opioid receptors. And opium's structure stands in family resemblance relations to the structures of many other (though not all) dormitive drugs. Rahul's gregariousness might be explained by cognitive and neural mechanisms that dispose Rahul to behave in certain ways in certain social situations, and perhaps those mechanisms bear some family resemblance relations with cognitive and neural mechanisms in other people that fall into the same statistical category as Rahul. If one is to appeal to dispositions to explain regularities in behavior, it would appear one must commit one's self to the existence of some property or trait that *grounds* (or is responsible for) regularities in behavior.

Many dispositions are grounded in underlying mechanisms that explain why the disposition is manifest in the relevant conditions (Machamer, Darden, and Craver 2000; cf. Cartwright 1989). Behavioral regularities are explained by component parts standing in a more or less stable set of causal, spatial, and temporal relations with one another. Dispositional descriptions might thus be understood as abstract gestures at the existence of some such *grounding property*, the property or mechanism that explains why individuals with the disposition manifest their effects in the right conditions. Dispositional descriptions allow one to abstract away from individual differences in grounding mechanisms. Moliere's warning is that one can abstract away from the relevant grounding mechanisms only so much before sliding into the kind of superficial posit he invented dormitive virtues to lampoon.

From an ontological point of view, there is an apparent parity between the contribution that a grounding mechanism makes to the manifestation of a disposition and the contribution made by the conditions in which the disposition is manifest. The grounding property cannot manifest the disposition alone, but requires the contribution of reciprocal dispositional partners (Heil 2003; 2012). Salt and water jointly manifest dissolving.

### 3. REGULARITIES AND CONDITIONALS

There are other reasons, independent of Moliere's problem, to question whether dispositions can properly be analyzed in terms of regularities alone.

Carnap (1928) considers the possibility of defining dispositional terms explicitly in terms of a conditional generalization relating conditions and manifestations:

x has disposition d to e in conditions c if and only if (if x is in conditions c, then x manifests e).

Ryle (1949) gives an example: "To say that this lump of sugar [x] is soluble [d] is to say that it would dissolve [e], if submerged anywhere, at any time and in any parcel of water [c]" (1949: 123; see Goodman, 1954; Ryle 1963). Likewise, to say that Rahul (x) is extroverted (d) is to say that if he were to be in social conditions (c), then he would be gregarious and the like (e). This logical formulation has the unacceptable consequence that any item not in conditions c has the disposition d. The if-then statement (the conditional) in parentheses on the right-hand side of the if-and-only-if statement (the biconditional) is true whenever its antecedent is false, according to the standard semantics for such conditionals. So according to Ryle's logical analysis, the shyest boy in the world turns out to be extroverted, so long as he is kept in solitary confinement.

To avoid this problem, Carnap (1928) replaced the goal of definition with the goal of partial definition or, as he called it, reduction. A reduction sentence shows that dispositional terms can be given a partial definition in terms of non-dispositional features of the world. He proposed the following reduction sentence for dispositional terms:

If individual x is in conditions c, then (x has disposition d if and only x manifests effects e).

If Rahul (x) is at a party (c), then he is extroverted (d) if and only if he is assertive, gregarious, and so on (e). This formulation solves the above definitional problem: the imprisoned shy boy is never in social conditions, and so is not a candidate for having the disposition to extroversion. Yet, as Carnap recognized, this analysis fails to capture the idea that individuals have their dispositions in dormancy, as it were, even when the individual is not in the conditions for the disposition to manifest. The reduction sentence licenses the use of dispositional terms only when x is in conditions c. But powdered sugar is soluble, and no bars can free the shyest boy in the world from his shyness. One might think that the very point of dispositional language is to express the thought that individuals carry dispositions with them even when the manifestation conditions for those dispositions do not hold.

### 4. WHICH REGULARITIES?

Set these definitional problems aside now to consider the more minimal claim that for x (sugar) to have disposition d (solubility) it is necessary that there be some regularity relating x's (sugar's) being in conditions c (water) and x's (sugar's) manifesting e (dissolving). What sort of regular relationship between dissolving and being in water does one intend to assert, however, when one says that sugar is disposed to dissolve in water?

As discussed above, empiricists of the mid-twentieth century (Carnap 1928, Ryle 1963, Hempel 1952) characterize these regularities using if-then statements:

If  $x$  is disposed to  $e$  in  $c$ , then (if  $x$  is in  $c$ , then  $x$  manifests  $e$ ).

Such a formulation emphasizes cases in which the individual's being in the manifestation conditions is sufficient for the individual to manifest the effects. The case of solubility approximates this ideal; barring heroic circumstances (see below) the powdered sugar will dissolve when placed in water. But this is surely a special case.

Dispositions as a rule fail to indicate the existence of such sufficient causes. Dispositions are often a matter of probability or degree. Rahul need not be indiscriminate, assertive and gregarious in every social encounter, to be an extrovert. Perhaps it is more appropriate, then, to understand the intended regularity in probabilistic terms (with sufficient conditions assigning a probability of one to  $e$  in  $c$ ). Perhaps the required regularity would suggest Rahul will more likely than not be assertive and gregarious in social settings:

If  $x$  is disposed to  $e$  in  $c$ , then (if  $x$  is in  $c$ , then  $x$  most likely manifests  $e$ ).

Yet even this formulation is too strong in many cases. To say that a person has a genetic disposition to develop major depressive disorder (MDD) is not to say that a person with the genetic grounding property for this disposition is *likely* to manifest MDD. It is surely more accurate to say that a person with this genetic grounding property is more likely to exhibit MDD than is someone lacking one or more of those genetic grounds (other things being equal). Likewise, it would seem Rahul need not be assertive and gregarious more often than not in order to count as extroverted. Rather, Rahul need only be more assertive and gregarious than the average Joe.

In some cases it seems more appropriate to characterize a disposition in terms of magnitude differences (or higher-order differences in such). Sugar is more soluble than dextrose in the sense that it dissolves faster in water. Rahul might be more extroverted than Nadja not only by being more likely to be gregarious in social settings, but also by being more gregarious in social settings. Rahul's extroverted disposition might manifest itself as a magnitude difference, a probability difference, or both. A person with a genetic disposition to MDD might simply become more depressed in moments of crisis.

These last two considerations suggest the need to introduce a comparative element to dispositional terms. To say that an individual  $x$  (sugar) is disposed to manifest  $e$  (dissolve) in  $c$  (water) is, at least in many cases, to make a claim about  $x$  *relative to a contrast class*. To say that Rahul is extroverted is to say that he is more prone to gregariousness than others; perhaps he is above the mean. And most things we call insoluble are, in fact, only poorly soluble. Perhaps, then, the following sentence expresses the required regularity:

If  $x$  is disposed to  $e$  in  $c$ , then  $x$  is more likely to manifest  $e$  in  $c$  or  $x$  likely manifests  $e$  more (faster, etc.) in  $c$  than individuals not disposed to  $e$  in  $c$ .

A similar formulation has been developed by Manley and Wasserman (2008). Surely some regularity such as this must hold if an individual is properly said

to have the disposition in question. If no such regularity holds, it is difficult to see how dispositional claims could be established on the basis of evidence. The term might serve a metaphysical purpose, but it would be irrelevant to the dispositional claims scientists routinely make.

#### 5. IS ANY REGULARITY REQUIRED?

Some thinkers hold that no regularity relating conditions and manifestations, no matter how comparative, probabilistic, or admitting of degree, need be true of an individual for the individual to qualify as having a disposition. The emphasis, they hold, should not be on the regularity between conditions and manifestations but rather on the property, mechanism, or trait of the individual in virtue of which the manifestations are produced when they are produced. In short, it appears possible for an individual to have a disposition to do something that it never, in fact, does.

Two examples of this sort are discussed above. First, an individual might have a disposition and yet never manifest that disposition because the relevant manifestation conditions never occur. Second, if dispositions are understood probabilistically, it is possible that an individual with a disposition might enter its manifestation conditions a finite number of times and never in fact manifest the disposition. As discussed above, both these desiderata can be met by the more ornate formulations of Section 4.

A more fundamental challenge to the regularity approach is raised by two families of counter-examples widely discussed in the philosophical literature on dispositions. The first family of counter-examples involve self-defeating manifestation conditions, manifestation conditions that trigger the dispositions but, in so doing, disarm the grounding mechanism by which it produces its characteristic effect. C.B. Martin (1994) called these *finkish* dispositions, or *finks*. The clearest examples of finks are contrivances: inserting the key in the ignition disconnects the starter, short-circuiting the key's disposition to start the car. There are less fanciful examples as well: A verbal insult disposed to cause psychological harm might fail to manifest this disposition because the insult discredits the insulter and robs his words of sting. Such examples help to emphasize the contribution that grounding properties make to whether an individual has a disposition. Sometimes these grounding properties are called intrinsic or categorical properties of individuals. It is in virtue of having such intrinsic, grounding properties that an individual may be said to have a disposition even when it is not manifesting it. So understood, dispositions need not give rise to Molliere's problem: the opium's chemical structure (and its relation to the chemical structure of opioid receptors) explains its dormitive effects. David Lewis (1977) makes this kind of requirement explicit, emphasizing the importance of grounding properties and their causal involvement in the production of the relevant effects:

Individual x is disposed to e in c if and only if (if x has some intrinsic grounding property g and if x were to retain g in c) then g and c would jointly cause e.

The idea that g (molecular structure) and c (water) jointly cause e (dissolving) could be understood in a number of ways, as discussed in the preceding section. More centrally, however, Lewis' account stipulates that the individual in question must retain the grounding property in the manifestation conditions. This

analysis shows how we can modify the conditional analysis in such a way that finks are no longer a counterexample, given that the individuals in such cases do not retain their grounding properties in the relevant conditions.

The second, and perhaps more compelling, kind of problem case involves masking. Masking occurs when the conditions for manifesting a disposition leave the grounding properties in place but prevent the disposition's manifestation via a distinct causal route. Perhaps Nadja is very shy, and so disposed to avoid social situations much more than is Rahul, but has trained herself to compensate for her shyness. As her feelings of social anxiety rise, she consciously tries to engage people. It seems natural to say that Nadja is shy even though the conditions that tend to manifest her shyness have come also to instigate strategies that short-circuit shy behavior. Nadja is disposed to shyness, and the grounding properties required for its manifestation remain in place, but she masks it with protective factors (Bird 1998).

The possibilities of finkish and masked dispositions suggests that an individual's disposition to behave might be uncoupled entirely from the individual's actual pattern of behavior and, with some embellishment, might be uncoupled entirely from the actual behavior of individuals of the same type. However, there is some reason for caution in interpreting these examples. It should be noted that not all people share the intuition that individuals really have finkish and masked dispositions; for some, the fuse-clipping rocket is not disposed to launch, and Nadja is not dispositionally shy. Perhaps a comparative analysis would help to diagnose our thinking in these cases: Perhaps finkish and masked dispositions are dispositions that would hold if the short circuit were removed. In each case, an individual with the grounding properties  $g$  would exhibit the effect were it not for the short-circuit. The finkish cases can thus be seen as dispositionally intermediate between cases with  $g$  and no short-circuit (which have the full-blown disposition) and cases in which  $g$  is absent and the short-circuiting is present (which are maximally indisposed). The individual with  $g$  and no short circuit is disposed to  $e$  relative to the finkish and masked cases. The individual lacking  $g$  is not disposed to  $e$  relative to either of the others.

Finally, to decouple an individual or type of individual's dispositions from their actual behaviors is to decouple dispositions conceptually from the evidence by which dispositional claims are routinely evaluated. For exactly the same reason, to decouple an individual's dispositions from its actual behavior is to decouple the notion of disposition from the primary practical reason for attributing dispositions to individuals in the first place: to predict how those individuals will behave, to cluster like with like, and to devise strategies to make them behave in new ways.

Perhaps it is wrong to think that dispositions can be fully understood exclusively in terms of either regularities or traits. Dispositions are partly a matter of regularities connecting conditions and manifestations, and they are partly a matter of the more or less intrinsic properties or mechanisms of the individuals that have those dispositions. Claims about dispositions are, for this reason, prone to equivocation between dispositions as mere regularities in behavior and dispositions as traits or characters born by an individual over time.

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