

LEXICON OF KEY TERMS

INTRODUCTION

This lexicon was produced by a multidisciplinary team of experts. It offers guidance on the meaning of key terms in research on free will and related issues. Usage of these terms in “Science of Free Will” and “Conceptual Underpinnings” grant proposals is expected to conform to the usage set out in this lexicon. In several cases, two or more options for usage of a term are offered.

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KEY TERMS

Action. Includes both overt actions (that is, actions essentially involving bodily motion) and nonovert actions – for example, choosing or deciding to do something (see *Choice; Decision*). Overt actions involve bodily movements that are appropriately related to mental and neural processes of the agent. There are many different varieties of action, corresponding to different relations between bodily movement and mental/neural processes. For example, a given bodily movement may be caused by a reflex response to an external stimulus or may be produced voluntarily. These would correspond to reflex actions and voluntary actions respectively. Precise descriptions of mental and neural antecedents are important in developing a theory about how overt actions are produced.

Agency. The property of being an agent.

Agency, experience of. The experience of an action or effect as caused by oneself. As with other experiences, experiences of agency can be misleading. It is possible to have this experience even when an action or effect was not caused by oneself. It is important to distinguish between *experience* of agency and explicit *judgments* about whether oneself, or another agent, is the cause of a particular action or event.

Agent. A being that acts.

Agent causation. A view according to which, for an agent to choose *freely*, she must directly and consciously initiate her own decision or intention to act. Such a capacity would be basic— not being constituted by more fundamental psychological or neurophysiological mechanisms— and so would necessarily be emergent [see *emergence*.] Contemporary philosophical proponents who take seriously the possibility that human beings might possess this sort of capacity seek to

show how it might be integrated with and constrained by conscious and unconscious psychological mechanisms, and so subsumable in principle within a comprehensive scientific account of agency. For these accounts to be satisfied, the influence of antecedent factors on choices must be probabilistic only, and not deterministic. (See *causation*.)

Authorship. To be an author of an action or effect is to be the agent who produced it.

Authorship, experience of. The experience of being the agent who produced an action or effect. As with other experiences, experiences of authorship can be misleading. It is possible to have this experience even when one was not the author of an action or effect.

Automatic processes 1. Any process with one or more of the following features: the being (e.g., person) in whom the process takes place is not aware of the process; the being lacks an intention to initiate the process; the being lacks control over the process; the process involves minimal use of cognitive resources. Any one of these features suffices to make a process automatic. Some automatic processes have several or all of these features.

Automatic processes 2. Processes issuing in actions when the mental and neural activity causing the actions involves little or no conscious thought and little or no voluntary control. Many actions become increasingly automatic with learning. So even complex actions can depend heavily on automatic processes.

Causal factor. X is a causal factor for Y if and only if X is among the factors responsible for, or productive of, Y's occurrence. Whether causation, as either an empirical or conceptual matter, is to be reductively analyzed in terms of the holding of scientific laws describing types of events or instead is a basic relation grounding such laws is controversial. This matter is left open here.

Choice. An act of selecting or settling on a course of action. Choosing is distinguished from any deliberation that precedes the choice. Agents choose among options or apparent options. Many choices are responses to uncertainty about what to do. Routine intentional actions (e.g., unlocking your door when you arrive home) typically are not preceded by choices to perform them partly because the agents who perform them are not uncertain about what to do. But agents may be said to choose in some situations in which they are certain about what to do. For example, hungry people who are offered their favorite meal or a banana as dinner options may be said to *choose* the former.

Distal choice. A choice to do something later.

Proximal choice. A choice to do something now.

Compatibilism about determinism and free will. The thesis that the existence of free will is compatible with the truth of determinism.

Compatibilism about determinism and moral responsibility. The thesis that the existence of moral responsibility is compatible with the truth of determinism.

Consciousness. See *Consciousness 1, 2, and 3.* Whether or not the phenomena identified in the following three entries are wholly distinct is a substantive question that is left open here. Consciousness 1, 2, and 3 all seem to come in degrees and none of them entails that subjects have perfect awareness of their current conscious states.

Consciousness 1. Phenomenal consciousness. A state of mind is conscious if and only if there is something it is like *for* the subject to be in the state. It is experienced as having essentially first-personal (“subjective” or “phenomenal”) qualities. Examples of such qualities would be the differing ways that the same red rose looks under different lighting conditions and from different vantage points, or the sensation of pain or an itch or elation. Sometimes the phenomenal character of a conscious experience is contrasted with whatever intentional or representational content the experience has (i.e., the information the experience provides about the *object* of the experience, such as a rose). The intentional content *that the rose is red* concerns the rose – its property (we now know) of reflecting light in a characteristic way. But the subjective quality of a red experience – its simply looking a certain “reddish” way – is a primitive feature of the experience. A different sort of cognizer might have an experience with the same intentional content that is conveyed via a different sort of phenomenal quality. And it is sometimes claimed that some experiences, such as pains, itches and emotional feelings, are not about anything the subject is perceiving or thinking about. The relationship between phenomenal character and representational content is controversial; this matter is left open here.

Consciousness 2. Access consciousness. A state of mind is conscious if and only if it is poised for use in reasoning and other forms of reasons-guided activity. The information or representational content in such states is directly accessible by their subjects.

Consciousness 3. Reflexive consciousness. A state of mind is conscious if and only if its subject is aware of having or being in that state. Conscious states, in this sense, may be thought either to be represented in higher-order states or to represent themselves. Beings that regularly have reflexively conscious states are said to be “self-conscious.”

Control 1. One has control over one’s behavior to the extent to which one can modify it with conscious, deliberative efforts.

Control 2. One has control over one's behavior to the extent to which one can bring about outcomes that one intends.

Control 3. Immediate conscious control over, for example, what one decides to do. One has immediate conscious control over what one decides to do if and only if at the time at which one made the decision one made, one was able to make an alternative decision or do something other than decide as one in fact did. Such control may come in degrees, reflecting the extent to which, e.g., one was consciously aware of one's own motivations.

Control 4. Indirect control. One had indirect control over a decision or action at a time t if and only if one was able at some earlier time to act in such a way that one would have subsequently decided or acted otherwise at t , and one could have reasonably foreseen this alternative future outcome. For example, a highly intoxicated person who drives a car and hits a pedestrian may have indirect control over his action by virtue of having been able to refrain from consuming the intoxicating substance.

Decision (practical). Practical deciding is to be distinguished from deciding that something is true. Practical deciding may be identified with choosing. See *Choice*.

Distal decision. A decision to do something later.

Proximal decision. A decision to do something now.

Determinism. The thesis that a complete statement of the laws of nature together with a complete description of the entire universe at any point in time logically entails a complete description of the entire universe at any other point in time.

Determinism (which is sometimes referred to as "causal determinism") is a stronger thesis than the thesis that every event has a cause or set of causes. Determinism is a claim about the nature of the most fundamental causal laws (or "laws of nature") – namely, that the laws describe dynamical patterns that always yield unique outputs for every complete input. This contrasts with views according to which the fundamental laws are merely statistical or probabilistic: these views hold that for every complete input, there is a range of possible outputs weighted by objective probabilities or likelihoods. If determinism is false, an action may be caused but not deterministically caused. This distinction is crucial to understanding many "libertarian" views about free will. See *Laws of nature; Libertarianism*.

Emergence. In general, emergent phenomena are complex phenomena that "arise out of" more fundamental phenomena and yet are importantly distinct in form or pattern. Theorists conceive emergence in several more specific ways of increasing strength.

Emergence 1. Emergence as unpredictability. Emergent 1 phenomena are those whose appearance cannot be predicted or anticipated from a knowledge of the lower-level processes alone.

Emergence 2. Emergence as explanatory autonomy. Emergent 2 phenomena are those which can be described and understood through concepts that have no application to the lower-level phenomena on which they depend.

Emergence 3. Emergence as stability or invariance. Emergent 3 phenomena are stable or invariant under a wide range of change of lower-level parts and their arrangements.

Emergence 4. Emergence as ontologically/causally basic phenomena. Emergent 4 phenomena involve the appearance of basic (physically unrealized) properties or processes when systems achieve a kind or threshold level of organizational complexity. Basic holistic features imply a kind of equally fundamental influence on the system's behavior.

Epiphenomenal. To say that a mental state or event is epiphenomenal is to say that it does not cause any physical events.

Epiphenomenalism. The thesis that although mental events are caused by physical events, no mental events cause any physical events.

Free action

1. Compatibilist theories about: According to compatibilist theories about free action, any intentional action performed on the basis of informed, rational deliberation by a sane person in the absence of compulsion and coercion is a free action even if the action was deterministically caused. (The preceding statement is about proposed *sufficient* conditions for free action. It is not being suggested, for example, that free actions must be based on deliberation.)

2. Incompatibilist theories about: According to incompatibilist theories about free action, acting freely depends on the falsity of determinism. In at least paradigmatic cases of free action, the combination of the past – right up to the time of action – and the laws of nature leaves two or more options open to the agent. The main difference between incompatibilist and compatibilist theories of free action concerns the openness just mentioned. Theories of the former kind require it for free action, and theories of the latter kind do not. Obviously, the claim that this kind of openness is necessary for free

action does not entail that every action performed in the presence of this kind of openness is a free action; there may be additional necessary conditions for free action.

Free will. The ability to perform free actions or to act freely. See *Free action*.

Incompatibilism about determinism and free will. The thesis that the existence of free will is incompatible with the truth of determinism.

Incompatibilism about determinism and moral responsibility. The thesis that the existence of moral responsibility is incompatible with the truth of determinism.

Intention. A distinctive attitude toward a prospective course of action that is to be distinguished from such things as choices, urges, desires, wishes, and beliefs. One who intends to do something is at least temporarily settled on doing. The contents of intentions may be regarded as plans. Some plans are very simple: for example, a representation of a to-be-performed wrist flexion. Others are complicated: a plan for traveling from Tallahassee to Guangzhou is a case in point.

Automatic reactions, that depend *immediately* on a preceding stimulus, such as reflexes, do not involve intentions (though a person's intentions may modulate such reactions). The relation between intention and consciousness should be specified clearly. For some, intentions are conscious states, while others accept unconscious intentions. We suggest that authors explicitly state whether intentions, as they use the term, must be conscious states or may be unconscious states.

Distal intention. An intention to do something later.

Proximal intention. An intention to do something now.

Distal intentions can be formed a long time before action itself, whereas proximal intentions are close to the moment of action. The two kinds of intention may also differ in specificity and content: distal intentions may contain little or no detail about when and how an intention is carried out, whereas proximal intentions may specify precise motor details of forthcoming action. Some researchers hold that both distal and proximal intentions have identifiable cerebral correlates; and intentions are often discussed as brain states, not just as mental states.

Intentional action 1. In paradigmatic instances of intentional action, agents intend to do what they intentionally do. Sometimes the intentions are formed in acts of choosing or deciding, and sometimes not (see *Choice; Decision*). If unlocking your office door in the morning is part of

your routine, you might have intended to unlock it this morning and intentionally unlocked it without having chosen or decided to unlock it.

Whether all intentional actions are intended is a disputed issue. Consider a business executive who knows that instituting a certain profit-making program will harm the environment several years later, wishes that the program were not problematic in this way, and tries to cover up the fact that the program he or she has decided to institute endangers the environment. It is left open here that such a person harms the environment intentionally even though he or she lacks an intention to harm it.

Intentional action 2. Actions that are preceded by an intention, and for which the intention plays an appropriate causal role in bringing the action about. Intentional actions should be distinguished from stimulus-driven actions such as reflexes, where the initiation of the action follows directly from a stimulus (see *Reflex action*). Several intermediate possibilities exist between reflex action and fully intentional action. For example, actions governed by rules (e.g., ‘Green means GO’) lie somewhere between fully intentional actions and stimulus-driven responses.

Intentional action 3. See *Voluntary action 1*.

Laws of Nature. Laws of nature, to a first approximation, are true, non-accidental generalizations about the universe. They are true statements, and hence not to be identified with the claims of current theories, but instead are what those theories aim to accurately reflect or at least approximate. They are non-accidental truths, in that their truth is an important ingredient in fixing the world’s basic character. It is likely a true generalization that there is no solid gold sphere of a diameter of one mile, but this truth does not help to fix the world’s character, but is instead a contingent byproduct of the world’s laws and initial configurations. Finally, laws of nature are generalizations that describe patterns.

What makes laws of nature true is controversial. According to one view, laws are just brute truths, generalizations that happen to obtain. According to another view, laws describe a kind of primitive structure to the world. According to a third view, laws reflect general truths about the ways the causal propensities of physical systems interact and co-evolve.

Libertarianism. The combination of incompatibilism and the thesis that free will exists. Libertarianism in this technical philosophical sense is distinct from what is called libertarianism in other domains – for example, politics.

Moral responsibility. A kind of responsibility required for justified moral blame or credit. Moral responsibility is to be distinguished from mere causal responsibility. (Beings have causal

responsibility for whatever they cause. A one-year old child may cause a plate to break and so be causally responsible for breaking it. But few people would say that the child is morally responsible for breaking it.)

Readiness potential (RP). A progressive increase in brain activity prior to intentional actions, normally measured using EEG, and thought to arise from frontal brain areas that prepare actions. An important distinction should be made between the generalized readiness potential and the later, lateralized readiness potential, marked by the time-point at which brain activity in the hemisphere contralateral to action begins to exceed activity in the hemisphere ipsilateral to the action. Thus, lateralized readiness potentials involve a choice or specific intention regarding *how* to move (e.g., left hand or right hand) which the generalized readiness potential does not. Readiness potentials should also be distinguished from stimulus-related potentials, including the neural response to a ‘Go’ stimulus, and the Contingent Negative Variation (CNV) indicating expectation of an external stimulus. RPs reflect both the developing preparation of the action plan, and the mental effort associated with developing it.

Reflex action. A bodily movement that arises as a direct, rapid, and automatic response to an external event (see *Automatic processes*). Reflex actions do not involve voluntary initiation of the response. However, an agent’s voluntary actions, and even their intentions to act, can strongly modulate the strength and pattern of reflex responses. See *Voluntary action*.

Responsibility. See *Moral responsibility*.

Self-control 1. An agent’s capacity to sustain, stop, amplify, or otherwise modify an incipient or unwanted response or action. See *Willpower*.

Self-control 2. The process of consciously sustaining, stopping, amplifying, or otherwise modifying incipient or unwanted responses or actions. Self-control is often associated with conscious effort and often involves overriding a default course of action. People can exercise self-control over emotions (emotion suppression is most common), attention, urges, thoughts (thought suppression is common), and behavior maintenance (persistence at a challenging task is a common example). See also *Veto*.

Self-regulation. Conscious or nonconscious goal pursuit, which entails sustaining, stopping, amplifying, or otherwise modifying responses or actions. See *Self-control 1* and *2*.

Urge 1. Wanting to do something.

Urge 2. The word “urge” has been used to indicate a conscious sensation that one is about to make, or wants to make, a movement. In this sense, urges are similar to conscious experiences

of proximal intentions and having an urge does not imply that the action is desirable, or even intended (direct brain stimulation can produce a completely involuntary experience of impending action that has been described as urge).

Veto. Veto is normally described as an internal, voluntary decision to withhold or cancel an impending action. The internal inhibition involved in vetoing contrasts with inhibition following an external ‘stop’ signal. Veto has an important temporal dimension because an action cannot be inhibited after a certain ‘point of no return’ is reached, when the brain’s motor execution areas have committed to the action. Following Benjamin Libet’s seminal work, the veto process is sometimes described as involving brain-independent conscious causation, in which the veto process has no neural antecedents, but has the direct effect of interrupting ongoing brain activity. But in general, there is no particular reason to expect veto processes to have a different relationship to consciousness and to brain activity than other processes. Veto signals might occur without consciousness, or a conscious decision to veto might have unconscious antecedents in the brain. The ability to veto an action that one strongly wishes to perform (see also *Urge*) is an important element of self-control.

Voluntary action 1. An action that is not caused by external factors or events, or is at least relatively unconstrained by external factors or events.

Voluntary action 2. Free action. See *Free action*.

Will. The capacity to initiate intentional actions, or the component of the human mind that initiates intentional actions. This term is used in many other senses as well. Applicants who use the term must clearly state what they mean by it.

Willing. The mental/neural event of initiating intentional action. This term is used in many other senses as well. Sometimes it is used to mean choosing, deciding, or intending. Sometimes it seems to mean trying or perhaps the mental aspect of trying. And sometimes it seems to be understood as a combination of intending and trying (or the mental aspect of trying). In all of these uses, willing is distinguished from mere wanting. Applicants who use the term must clearly state what they mean by it.

Willpower. An agent’s capacity to sustain, stop, amplify, or otherwise modify an incipient or unwanted response or action. See *Self-control 1*.