**Appendix: Working Definitions**

Examples of definitions in the literature serve as contexts for understanding our working definitions. Definitions will be given in alphabetic order of the terms to be defined.

**Affective processes**

Examples of definitions in the literature.

1. “Emotion is a complex set of interactions among subjective and objective factors, mediated by neural~hormonal systems, which can (a) give rise to affective experiences such as feelings of arousal, pleasure/displeasure; (b) generate cognitive processes such as emotionally relevant perceptual effects, appraisals, labeling processes; (c) activate widespread physiological adjustments to the arousing conditions; and (d) lead to behavior that is often, but not always, expressive, goaldirected, and adaptive.” (Kleinginna & Kleinginna, 1981a, p. 355)
2. “Core affect - A neurophysiological state that is consciously accessible as a simple, nonreflective feeling that is an integral blend of hedonic (pleasure–displeasure) and arousal (sleepy–activated)”. (Russell, 2003, p. 147)

Working definition for this article

Those processes involved in, bringing about, or altering subjective experiences (feelings) of pleasure/displeasure and activation

Clarifications.

Affective processes subsume emotions, which have been construed as affective episodes directed at objects which are being appraised in a way characteristic to a concrete emotion, involving bodily changes, and motivational consequences (Kleinginna & Kleinginna, 1981; Mulligan & Scherer, 2012).

**Behavior**

Examples of definitions in the literature.

1. “The totality of intra- and extra-organismic actions and interactions with its physical and social environment. Psychology deals with three types of phenomena: 1) Observable behavior […] 2) Introspectively observable phenomena […] 3) Unconscious processes […]” (Dictionary of Behavioral Science, Wollmann, 1975)
2. “behavior—defined in the broad sense to include actions, cognitions, motivations, and emotions“ (Fleeson & Noftle, 2008, p. 1357)
3. “The behavior of an organism is everything it does, including covert actions like thinking and feeling” (Pierce & Cheney, 2004, p. 1)
4. “behaviour may be deﬁned as verbal utterances (excluding verbal reports in psychological assessment contexts) or movements that are potentially available to careful observers using normal sensory processes.” (Furr, 2009, p. 372)
5. “behaviour is what an organism observably does or says” (Watson, 1925, p. 6)

Working definition for this article.

1. Behavior in a broad sense: everything an organism does. This includes observable actions, covert actions, cognitions, motivations, and emotions (see definitions 1, 2, 3).
2. Behavior in a narrow sense (observable/overt behavior, according to definitions 4, 5): overt behaviour deﬁned as verbal utterances and their content (e.g. asking for help), non-verbal utterances (e.g., clearing one’s throat), movements that are potentially available to careful observers using normal sensory processes, certain physiological reactions (e.g. blushing), lack of movement in certain contexts (e.g. sleeping, freezing, ignoring)

Clarifications.

Available definitions in the literature vary from broad and inclusive (1, 2, 3) to rather narrow conceptions of behavior (4 and 5).

**Causality**

Examples of definitions in the literature.

1. “Three criteria of Mill (1843). These hold that X can be considered a cause of Y if (a) X and Y covary; (b) X precedes Y; and (c) ceteris paribus, Y does not occur if X does not occur.” (Borsboom et al. 2003, p. 211).
2. “Aristotle distinguished four causes—efficient, final, material, and formal—that may be illustrated by the following example: a statue is created by a sculptor (the efficient) who makes changes in marble (the material) in order to have a beautiful object (the final) with the characteristics of a statue (the formal).” (The Columbia Electronic Encyclopedia®, 2013)
3. “A cause is…an insufficient but non-redundant part of a condition which is itself unnecessary but sufficient for the result” (INUS condition; Mackie, 1965, p. 245)

Working definition for this article.

Definition 3) from above

Clarifications.

Causes antecede their effects; causes are necessarily followed by their effects only if hindering conditions are absent. Causes are not necessarily singular, but multiple (not even simultaneous) causes are possible.

As an example of the INUS condition, take rain as a cause of the grass being wet. Rain is not necessary for the grass’s wetness because other causes can have the same effect (e.g. sprinkler); and rain is also not sufficient in cases that hindering conditions are present (e.g. a roof).

**Change**

Working definition for this article.

We use the term “change” to describe differences between behavior at one time from that at some other.

Clarifications.

Changes can be short-term or long-term. Short-term changes are intra-individual differences in state levels. Long-term changes are intra-individual differences in trait levels (see development below).

**Cognitive processes**

Example of definitions in the literature.

processes by which “sensory input is transformed, reduced, elaborated, stored, recovered, and used.” (Neisser, 1967, p. 4)

Working definition for this article.

Definition from above

Clarifications.

Such processes include perception, attention, interpretation, semantic relationships, and memory.

**Development**

Example of definitions in the literature.

“The progressive series of changes in structure, function and behavior patterns that occur over the life span of a human being or other organism” (APA Dictionary of Psychology, VandenBos, 2006)

Working definition for this article.

Relatively enduring change, including i) decrease or increase in a person’s trait level; ii) relatively enduring change in trait expression; ii) relatively enduring change in personality structure

Clarifications.

Development can be due to a normative process like maturation or to individual-specific life circumstances and events. Development can be positive (adjustment, growth) but also negative (loss, decline, emergence of disorder).

**Explanation**

Example of definitions in the literature:

“a) Something that serves to … clarify (clarification, construction, decipherment, elucidation, exegesis, explication, exposition, illumination, illustration, interpretation); b) Statement of causes or motives (account, justification, rationale, rationalization, reason)” (American Heritage® Dictionary of the English Language, 2011).

Working definition for this article.

An explanation articulates a causal or functional relation, or a linked series of them, that can act or do(es) act to bring about some phenomenon.

Clarifications.

Explanations enable understanding of the mechanisms and processes that link cause or function and behavior. Naming the processes involved in a phenomenon is not necessarily an explanation, namely in cases when it does not offer reasons or causes for their co-involvement.

**Function**

Examples of definitions in the literature.

1. “Function - Animal behavior: In studying the function of a behavioral characteristic of an animal, a researcher seeks to understand how natural selection favors the behaviour. In other words, the researcher tries to identify the ecological challenges, or “selection pressures,” faced by a species and then investigates how a particular behavioral trait helps individuals surmount these obstacles so that they can survive and reproduce. In short, the question being asked is: What is the behaviour good for?” (Encyclopedia Britannica, Seeley & Sherman, 2009)
2. “The meaning of function … refers to the fact that elements in the current and past environment of an organism influence its behavior. Hence, behavior is a function of the environment (*function-of*). Nevertheless, the term functional can have other meanings, the most common of which in psychology refers to the goals or purposes of a specific construct in a broader context (*function-for*).“ (Perugini, Costantini, Hughes, & De Houwer, 2016, p. 34)

Working definition for this article.

The term ‘function’ can be used in at least three distinguishable senses. Accordingly, we distinguish three types of functions:

Type a) *Function* as causal relations between behavior and past and present situations as well as past state levels of the person (*function of)*

Type b) *Function* as behavior being adaptive for the organism (*function for*)

Type c) *Function* as an organism’s goal (conscious or unconscious) to produce a consequence (which may or may not occur)

Clarifications.

As an example, a mother might praise her son because he behaved prosocially and this has pleased her. In this sense her praising is a *function of* (type a) the boy’s behavior and her mood. Her goal might be to encourage him to show this behavior again in the future. Encouraging his behavior is the *function (type c*) of her praise, even if she is wrong and praising does not have the intended consequence. Finally, receiving praise might be adaptive in the sense of affecting the boy’s self-esteem and academic achievement. This in turn may affect his success in finding a mate (and reproducing). Praising in this sense would be *functional for* (*type b*) the organism at the individual level (self-esteem, academic achievement) and the level of his family’s continuity (survival fitness).

In the mathematical sense, the term function can be used for describing relations among variables without involving causal relations. For the purpose of this article, however, we restrict the use of function to the three meanings outlined above.

**Mechanism**

Example of definitions in the literature.

“A mechanism is a structure performing a function in virtue of its component parts, component operations, and their organization. The orchestrated functioning of the mechanism is responsible for one or more phenomena” (Bechtel & Abrahamsen, 2005, p. 423).

Working definition for this article.

A system of components, operations, and their organization that together produce a phenomenon (in the context of this article, behavior or clusters of behaviors).

Clarifications.

The concept of “psychological mechanism” implies a mechanistic view of causality and functions (a, b, c). When we posit psychological mechanisms, we try to view human experience and behavior in analogy to physical (mechanical) laws. This does not necessarily imply deterministic links among the components. In fact, unlike the operation of mechanisms in classical physics, these links are usually conceptualized as being probabilistic.

We can take a clock as an example of a deterministic mechanism, typical of the physical conceptualization. Knowledge of the clock’s component parts, component operations, and their organization allows understanding of how the hands are set in motion by an impulse from the turning of the spiral.

It is almost certain that there are no mechanisms related to behavior that are as deterministic as the clock. Evidence for most of those hypothesized is mixed, likely precisely because of their highly probabilistic nature and thus high variability of operation both across and within individuals. One for which there is (arguably) reasonably consistent evidence is that people carrying a short allele of the serotonin transporter gene who experience stressful life events are more likely also to experience depression. This combination of stressful experience and tendency to express less serotonin in the brain can at best be considered a partial and probabilistic mechanism in generating a depressive episode, but it is perhaps a start.

Mechanisms can unfold as processes, involving steps that take place across time. But mechanisms do not have to be processes, as the example of the clock depicts a mechanism that does not precede the phenomenon it produces.

**Motivational processes**

Example of definitions in the literature.

1. “The phenomena of motivation are said to be (1) the maintenance of direction in behavior and (2) an increase in energy level.” (Duffy, 1941)
2. “Motivation refers to those energizing/arousing mechanisms with relatively direct access to the final common motor pathways, which have the potential to facilitate and direct some motor circuits while inhibiting others.” (Kleinginna & Kleinginna, 1981b, p. 272)

Working definition for this article.

Processes involved in the selective approach/avoidance of certain situations (or features thereof).

**Parameter**

Example of definitions in the literature.

“A numerical constant that characterizes a population with respect to some attribute” (APA Dictionary of Psychology, VandenBos, 2006)

Working definition for this article.

1. Properties of variables (such as sample mean)
2. Properties of associations between variables (such as beta weight of predictor)

Clarifications.

Parameters are estimates of hypothesized population-level constants generated by application of hypothesized model mathematical relations among variables in particular samples using particular measurement instruments. As such, parameters represent properties of psychological processes, functions, and mechanisms whenever these are described in mathematical language.

**Personality**

Examples of definitions in the literature:

1. “… an individual’s characteristic patterns of thought, emotion, and behavior, together with the psychological mechanisms – hidden or not – behind those patterns” (Funder, 2004, p. 5)
2. “… individual differences in characteristic patterns of thinking, feeling and behaving” (APA, n.d.)
3. “… those characteristics of the person that account for consistent patterns of feelings, thinking, and behaving” (Pervin, Cervone & John, 2005, p. 6)
4. “Personality psychology attempts to describe, predict and explain those recurrent behaviours that set an individual apart from some or all other age-mates” (Asendorpf, 2009, p. 43).

Working definition for this article.

A person’s characteristic pattern of behaviors in the broad sense (including thoughts, feelings, and motivation).

Clarifications.

The characteristic pattern of a person’s behaviors is relatively stable across time and useful to distinguish this individual from others. A pattern may be defined, for example, along several dimensions considered relatively independently, collections of relations among dimensions, or both. Relevant patterns can also include characteristic recurring patterns of change (e.g., patterns of emotional variability, reactivity, sensitivity).

**Personality structure**

Example of definitions in the literature.

“[…] a relatively stable arrangement of elements or components organized so as to form an integrated whole. Structure is often contrasted with FUNCTION to emphasize how something is organized or patterned rather than what it does. […]” (APA Dictionary of Psychology, Van den Bos, 2006)

Working definition for this article:

Manner in which traits or states are organized with respect to each other among individuals, or states organized within individuals.

Clarifications.

Traits (including motives, values, abilities, etc.; see working definition of traits above) can be ordered and aggregated according to the patterns of relations among them across individuals. This allows a parsimonious and potentially exhaustive system for the description of inter-individual differences in behavior.

Most research on personality structure has been concerned with inter-individual differences. However, the term ‘structure’ also applies to the relations among states within individuals as expressed over time.

**Process**

Example of definitions in the literature.

“A series of actions, changes, or functions bringing about a result“ (American Heritage® Dictionary of the English Language, 2011).

Working definition for this article.

A process is a series of steps (elements, components, actions) through which some phenomenon takes place or emerges. The term “process” necessarily makes reference to passage of time and implies changes or development during the referenced period.

Clarifications.

Processes of interest in psychology can be operations at the intrapersonal psychological level (e.g. perception, learning, thinking, information processing, or activity regulation), but also at the interpersonal level (e.g. turn-taking in conversation), at the intergroup level (e.g. emergence of group identity from an initial collection of strangers), and at intrapersonal biological levels (e.g. transaction of synapses).

**Psychological Trait**

Example of definitions in the literature.

“A relatively stable, consistent, and enduring internal characteristic that is inferred from a pattern of behaviors, attitudes, feelings and habits in the individual. Personality traits can be useful in summarizing, predicting, and explaining individual conduct, and a variety of personality trait theories exist, among them Allport’s Personality Trait Theory and Cattell’s Factorial Theory of Personality. However, because they do not explain the proximal causes nor provide a developmental account, they must be supplemented by dynamic and processing concepts such as motives, schemas, plans, projects and life stories.” (APA Dictionary of Psychology, Van den Bos, 2006)

Working definition for this article.

Quantitative dimension describing relatively stable inter-individual differences in the degree/extent/level of coherent behaviors, thoughts, feelings.

*Trait level*: individual score on a scale measuring a trait

Clarifications.

Relative temporal stability is the defining characteristic of traits. Content and breadth of expression are not defining characteristics of traits. This means that traits include all psychological dimensions of stable individual differences regardless of their content (personality, temperament, ability, attitude, value, belief, motive, emotion) and their width (habits, facets, domains, types). One can distinguish widths, for example, by using the terms ‘facet trait’ and ‘domain trait’. Personality as defined above consists of the levels of a person on all psychological traits.

**Situation**

Examples of definitions in the literature.

1. "A situation is a set of fleeting, dynamic, and momentary circumstances that do not lie within a person, but in his/her surroundings (i.e., in a more general and enduring environment). The situation harbors objectively quantifiable stimuli (cues) that may be perceived and interpreted by a person (thus creating psychological situation characteristics)." (Rauthmann, personal communication 2015.11.17)
2. “The environment is the general and persistent background or context within which behaviour occurs; whereas the situation is the momentary or transient background. Stimuli can be construed as being the elements within a situation” (Endler, 1981, p. 364)
3. “… seven circumstantial concepts related to situations: (i) occurrence, (ii) situation, (iii) episode, (iv) life event, (v) typical or commonly occurring situation, (vi) environment and (vii) context. One may think of these concepts as being ‘nested’ within each other like layers of an onion: specific occurrences (e.g. a new colleague is shaking hands with you) take place within a situation (e.g. being at your welcome reception as a new coworker), and this situation may be part of a longer episode in someone’s life (e.g. the first day at a new job). Certain episodes can amount to or represent life events (e.g. the first job), if they are significant, intense or enduring enough. Additionally, typical situations (e.g. going to work or doing some grocery shopping near home) may occur with some regularity. Occurrences, situations, episodes, life events and typical situations are all nested within someone’s habitual environment or socio-ecological niche (e.g. the workplace or home), which, in turn, are nested within sociocultural and historical contexts. Transitions from an occurrence to a situation or from a situation to an episode can be gradual, and generally, occurrences, situations, episodes, life events and typical situations may seep into each other” (Rauthmann, 2015, p. 242)

Working definition for this article.

A situation is a set of circumstances outside the person consisting of objectively quantifiable properties (often including other people) that may be perceived and interpreted by a person.

Clarifications.

Circumstances outside the person can be conceptualized more broadly or more narrowly and vary in their temporal duration (enduring environment, context, e.g., the school a student attends vs. occurrence, stimulus; e.g. being ask a question by the teacher). Stimulus is the smallest conceptual unit of circumstances outside the person. Examples of stimuli are the temperature of the hand one shakes, particular objects in the surrounding environment, and words used in experiments to trigger reactions, or in unstaged discussions.

**State**

Examples of definitions in the literature.

1. “State: (R.B. Cattell) Dimension describing change over-time within a single individual or in groups of individuals. Essentially, a factor-dimension in *intra*-individual change as contrasted with a Trait which describes *inter*-individual differences at any one time. […]” (Dictionary of Behavioral Science, Wollmann, 1975)
2. “A personality state is defined as having the same affective, behavioral, and cognitive content as a corresponding trait (Pytlik Zillig, Hemenover, & Dienstbier, 2002), but as applying for a shorter duration.” (Fleeson & Jayawickreme, 2015, p. 84)

Working definition for this article.

Quantitative dimension describing the degree/extent/level of coherent behaviors, thoughts, feelings at a particular time.

*State level*: individual momentary score on a scale measuring a state.

Clarifications.

A state dimension can be used to describe inter-individual differences at a specific time as well as intra-individual differences across time. States include all dimensions on which individuals tend to vary with considerable frequency over rather brief time spans, regardless of their content (e.g., emotion, motivation, cognition) and their breadth (e.g., negative affect vs. sadness or disgust).

The main difference between traits and states is the persistence of individual status. State levels can vary over short time periods; trait levels develop slowly or in rather persistent manners (even in cases of sudden increases or decreases in trait levels, e.g. due to traumatic experience or brain lesions, these changes then persist). Nevertheless, the content of some states can be identical to the content of some traits.