

# Psilocybin increases creativity via ego-dissolution and “Openness to Experience”

*A synopsis and hypothesis by Christopher B. Germann (Marie Curie Alumnus)*

Psilocybin (*O-phosphoryl-4-hydroxy-N,N-dimethyltryptamine*) is an indole alkaloid which was synthesized and named by the Swiss chemist Albert Hofmann<sup>1</sup> (Hofmann et al., 1959; 1958). The compound is present in more than 200 fungi species, some of which are endemic to the USA and Europe (e.g., *Psilocybe semilanceata*, known as “Liberty Cap”). In shamanic contexts, psilocybin has been utilized for spiritual and healing purposes for millennia. Its molecular structure closely resembles *5-hydroxytryptamine* (5-HT, serotonin). In humans, psilocybin functions as a prodrug and is rapidly dephosphorylated to psilocin (*4-N,N-dimethyltryptamine*) which acts as a non-selective partial 5-HT receptor agonist. It shows particularly high binding affinity for the 5-HT<sub>1A</sub>, 5-HT<sub>2A</sub>, and 5-HT<sub>2C</sub> receptor subtypes (Kraehenmann et al., 2015; Nichols, 2004). A landmark study conducted at Johns Hopkins University by MacLean, Johnson, & Griffiths (2011) experimentally demonstrated that a single high-dose of psilocybin can induce long-lasting personality changes in the domain “Openness to Experience”, as measured by the widely used NEO-PI (Personality Inventory). Openness to Experience (OTE) is one of the core dimensions of the extensively employed quinepartite (five factor) model of personality. OTE is an amalgamation of several interconnected

personality traits which include: 1) aesthetic appreciation and sensitivity, 2) fantasy and imagination, 3) awareness of feelings in self and others, and 5) intellectual engagement. Most relevant for the context at hand is the fact that OTE has a strong and reliable correlation with creativity (Ivcevic & Brackett, 2015; S. B. Kaufman et al., 2016; Silvia, Nusbaum, Berg, Martin, & O’Connor, 2009)<sup>2</sup>. Individuals with high scores on the OTE dimension are “permeable to new ideas and experiences” and “motivated to enlarge their experience into novel territory” (DeYoung, Peterson, & Higgins, 2005). In the John Hopkins study (op. cit.), the reported increase in OTE was statistically mediated by the intensity of the mystical experience induced by psilocybin. Importantly, it can be convincingly argued that ego-dissolution is a central feature of mystical experiences (see also Griffiths, Richards, McCann, & Jesse, 2006). Ergo, it is logically cogent to hypothesize that the experience of ego-dissolution predicts significant increases in creativity (possibly via the proxy of openness to experience). The “less ego/more creativity hypothesis” should be empirically tested in future studies on psilocybin and creativity.

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<sup>1</sup> Albert Hofmann (1906–2008) also discovered LSD in 1938 but he was unaware of its psychoactivity until 1943 when he conducted the first self-experiment. Hofmann, who later served as a member of the Nobel Prize Committee, stated on his 100<sup>th</sup> birthday: “*It gave me an inner joy, an open mindedness, a gratefulness, open eyes and an internal sensitivity for the miracles of creation. [...] I think that in human evolution it has never been as necessary to have this substance LSD. It is just a tool to turn us into what we are supposed to be.*”

<sup>2</sup> For instance, the Pearson correlation coefficient for “global creativity” and OTE is  $r = .655$  and for “creative achievement”  $r = .481$ . By contrast, “Math–science creativity” is not statistically significantly correlated with OTE ( $r = .059$ ; ns; for further correlation between various facets of creativity and the ‘Big Five’ factors see Silvia, Nusbaum, Berg, Martin, & O’Connor, 2009). The salient correlation between OTE and creativity has been reported in many studies (a pertinent meta-analysis has been conducted by Feist, 1998; a recent study reporting a strong relationship between OTE and creativity has been conducted by Puryear, Kettler, & Rinn, 2017). Furthermore, a meta-analytical structural equation model of 25 independent studies showed that OTE is the strongest FFM predictor of creative self-beliefs ( $r = .467$ ; Karwowski & Lebuda, 2016).