



Hans Eysenck's personality model and the constructs of sensation seeking and impulsivity

Marvin Zuckerman^a, Joseph Glicksohn^{b,c,*}

^a Department of Psychology, University of Delaware, USA

^b Department of Criminology, Bar-Ilan University, Israel

^c The Leslie and Susan Gonda (Goldschmied), Multidisciplinary Brain Research Center, Bar-Ilan University, Israel

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ABSTRACT

Fifty years ago, in their first meeting, Hans Eysenck and Marvin Zuckerman agreed that research was needed to clarify the relationships between Eysenck's Big Three (E = Extraversion, N = Neuroticism, and P = Psychoticism) and both impulsivity and sensation seeking. In later years, both Eysenck and Zuckerman agreed in their various publications, that sensation seeking correlates with both E and P, though more with P than with E. In fact, impulsivity and sensation seeking, might well occupy overlapping areas within the P + E + N + octant. In this paper, we discuss the similarities and differences among these various traits of extraversion, psychoticism, sensation seeking and impulsivity. We further present our position regarding the relationship of the constructs of arousal and arousability to these traits, suggesting that impulsivity is related to arousal, while sensation seeking is related to arousability.

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1. Introduction

Authors sometimes indicate the major influences of other authors on their own work in the dedications introducing a new book. Hans Eysenck (1967) dedicated his seminal book, *The Biological Basis of Personality*, "To the memory of Ivan Petrovich Pavlov and Sir Frances Galton". The first author's book, *Sensation Seeking and Risky Behavior* (Zuckerman, 2007), was dedicated "In memoriam to Hans Eysenck and Jeffrey Gray". Both of these mentors were directors of the Department of Psychology of the Institute of Psychiatry as it was then (now, the Institute of Psychiatry, Psychology and Neuroscience) in London during Marvin Zuckerman's sabbaticals there in 1975–6 and 1997–8, and Marvin continued his friendships with Eysenck and Gray over the subsequent years at conferences, visits to London and collaborations in research and publications.

Marvin first met Hans Eysenck in London on his way to an international conference on psychology held in Moscow in 1966, which Jeffrey Gray also attended and served as Eysenck's Russian translator. He had been developing a psychobiological theory of sensation seeking (Zuckerman, 1969) to use in experimental studies of sensory deprivation, with the limited goal of predicting individual differences in reactions to that situation. The scale was based on a hypothesis of a general theory of sensation seeking (SS) as seeking intensive sensations

(or avoiding them) across a variety of stimulus modalities (Zuckerman, Kolin, Price, & Zoob, 1964). The biological part of the theory related these individual differences to an old construct, 'the optimal level of stimulation' (Wundt, 1893). Eysenck listened with interest and silence, in his introverted manner, and then he responded, "Yes, I have been developing a theory of extraversion along the same lines". His response somewhat flummoxed the first author, who was not aware of Eysenck's use of the optimal level of stimulation in extraversion, and who prides himself on his scholarship. It turned out that Eysenck expounded the theory in his edited book, *Experiments with Drugs* (Eysenck, 1963), and later incorporated it into his 1967 full-blown arousal theory of personality, published in his seminal book *The Biological Basis of Personality* (Eysenck, 1967). But the coincidental similarity in the two theories presented no conflict for him because in his hierarchical model of traits, sensation seeking was a facet of impulsivity, which in turn was a component of the broader trait of Extraversion (E). Eysenck and Zuckerman agreed that more research was needed to clarify the actual relationships between Eysenck's Big Three (E, N = Neuroticism, and P = Psychoticism) and impulsivity and sensation seeking and their subtraits. A genetic study of impulsivity and sensation seeking, and the development of a new and shorter Sensation Seeking Scale (SSS-form V) were planned. All of these studies were done when Marvin returned to the Institute for his first sabbatical in 1975.

The new SSS-form V had the same four sub-factors as the earlier version (SSS-form IV), but in the new form there were the same number of items for each factor allowing the assessment of a Total score in place of the General score from the old version. The overlap of sensation seeking

* Corresponding author at: Department of Criminology, Bar-Ilan University, Ramat Gan 52100, Israel.

E-mail address: jglick@post.bgu.ac.il (J. Glicksohn).

and impulsiveness was investigated using a factor analysis of items from both tests (Eysenck, 2004; Eysenck & Zuckerman, 1978). Factor analysis revealed four sub-factors of impulsivity: narrow impulsivity, risk-taking, non-planning, and liveliness. A second analysis yielded two factors, one containing Impulsivity items and the other risk-taking and Sensation-Seeking items. The second factor was labeled *Venturesomeness*, although it could have been called Sensation Seeking on the basis of the content of the items and subsequent high correlations with the SSS.

2. On embedding sensation seeking and impulsivity within the Eysenckian Big three

Both Sybil Eysenck and Marvin Zuckerman were aware that there was a problem in trying to embed sensation seeking within the Eysenckian Big Three, for as they write in that first paper (S. Eysenck & Zuckerman, 1978, p. 483):

“At a lower level we have trait concepts such as sensation-seeking, and the problem arises as to the relationship between these traits and the superfactors; it cannot be assumed that each trait will be subsumed under just one superfactor. A further problem arises when we consider that each trait itself may be made up of several different subtraits, and that these too will have relations with possibly more than one trait and superfactor.”

When Zuckerman's (1979) book, entitled *Sensation Seeking: Beyond the Optimal Level of Arousal*, was reviewed by Eysenck (1981), he stressed that the average intercorrelation between SS scales was “only between 0.3 and 0.4, and that is not very high when we consider that, in part, these correlations themselves may be accounted for by the dependence of the four subscales on such higher order factors as extraversion and psychoticism” (p. 188). In commenting on Zuckerman's target essay in *Behavioral and Brain Sciences* (Zuckerman, 1984) a few years later, Eysenck continued this line of attack (Eysenck, 1984, p. 440):

“...sensation seeking does not really constitute a dimension; the correlations between the four components of sensation seeking are so low (sharing on the average only about 10% of the variance) that they do not define a single dimension. I would prefer to regard the items in Zuckerman's sensation-seeking scale as points in a three-dimensional space, defined by the three major dimensions of P, E, and N. Most of these points lie in the plane defined by P and E, and may be roughly grouped in the four sectors identified by Zuckerman.”

Now, it is clear that Eysenck was advocating for the primacy of the Big Three framework (Eysenck & Eysenck, 1985) in predicting behavior. Within this theory, both sensation seeking and venturesomeness appear as traits comprising the supertrait (or, what Eysenck viewed as a type, or dimension) of E. That is to say, at least in theory. The problem that was (and is) clearly apparent is that this hierarchical structure posited by Eysenck is not quite right. Zuckerman commented on this early on (Zuckerman, 1983, p. 33):

“Part of the problem is that Eysenck has worked from the top down, that is, from the broader traits to the narrower traits. Had he first developed narrower traits, as Cattell did, and derived the broader traits from the narrower ones using second order factor analysis, there would be a more coherent hierarchical pattern because the first order factors might have fit more neatly into the higher order factors.”

And as both Eysenck and Zuckerman agreed, sensation seeking correlates with both E and P (Eysenck, 1991, p. 776; Zuckerman, 1994, p. 178), though more with P than with E (Zuckerman, 1994, p. 178), in contrast with its postulated place within the hierarchical construct of E. On trying to embed SS within the Big Three, the second author

reported that a four-factor solution was required (Glicksohn & Abulafia, 1998). In addition to E and N, there is a factor that can be identified, following Zuckerman, Kuhlman, Thornquist and Kiers (1991), as *P-Impulsive-Unsocialized-Sensation Seeking (P-ImpUSS)*, with loadings of three SS subscales (ES = Experience Seeking, Dis = Disinhibition, and BS = Boredom Susceptibility), together with P. The fourth factor was marked by the SS subscale of Thrill and Adventure Seeking (TAS). We argued that there is a distinction here between an antisocial form of SS (ES, Dis, and BS) and a prosocial form of SS (TAS). A more recent study by Knust and Stewart (2002) has, in turn, suggested that ES might load together with TAS in delineating the prosocial form of SS, and given our more recent thought and work in this domain, we tend to concur.

That both Venturesomeness and SS were considered by Hans Eysenck as constituting separate traits comprising E is somewhat surprising, given the fact that there was great overlap in item content of the Venturesomeness scale and SS, as the first author has indicated above. Indeed, the items constituting Venturesomeness (Vent) are practically identical with those constituting TAS (Caci, Nadalet, Baylé, Robert, & Boyer, 2003; Zuckerman, 1994, p. 95), and this has been acknowledged by Sybil Eysenck (2004). She has distinguished between Impulsivity (Imp) and Vent by resorting to an analogy (S. Eysenck, 1993 p. 144):

“...to a driver who steers his car around a blind bend on the wrong side of the road. The driver who scores high on Imp never considers the danger he might be exposing himself to and is genuinely surprised when an accident occurs. The driver who scores high on Vent, on the other hand, considers the position carefully and decides consciously to take the risk, hoping no doubt for the ‘thrill’ of the sensation-seeking arousal caused by what he hopes will be merely a ‘near miss’.”

Following on from this same analogy, she stresses (Eysenck, 2004, pp. 110–111): “The venturesome high E scoring type of driver by contrast may also overtake in similar circumstances, but may be motivated by sensation seeking. He realizes fully the danger he is in and welcomes the adrenaline rush that this produces. Clearly, there is some impulsiveness in both drivers' actions, but the mechanism seems different.” Two points should be stressed regarding these remarks. First, that the sensation-seeking driver, according to this account, makes a *conscious* decision driven by sensation seeking, while the impulsive driver is driven by impulse and not by conscious decision. Second, that in the hierarchical structure of the Big Three, impulsivity appears under P. As Eysenck (2004, p. 110) stresses: “the truly impulsive high P scoring type of driver simply never considers the possibility of oncoming traffic and certainly never envisages a crash ensuing from his action.” Unfortunately, neither SS nor Imp can be strictly placed solely under one or the other supertrait.

Indeed, just as there is a problem in trying to embed SS within the Eysenckian Big Three, so there is a similar problem with respect to Imp. In fact, it is a similar problem, as Eysenck (1991, p. 776) writes:

“Much of the same problem arises with respect to the trait of impulsiveness ... This too breaks down into 4 factors: risk-taking, nonplanning, liveliness and narrow impulsivity. These factors are replicable from sample to sample, correlate only about 0.3 together, and correlate somewhat differently with P and E, as well as N. Thus, like sensation seeking, impulsiveness is a hybrid, neither clearly a trait nor clearly a type concept, lying in the hierarchical model rather uneasily between level 3 and level 4.”

In fact, Imp and sensation seeking, when each is broken down into its constituting traits, might well occupy overlapping areas within the P + E + N + octant, as Eysenck (1987, p. 489) cautions. In this same region, one can also embed Machiavellianism (Allsopp, Eysenck, & Eysenck, 1991).

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