

RUNNING HEAD: THE SIGNIFICANCE OF IMPLICIT PERSONALITY SYSTEMS AND  
TESTING: PERSPECTIVES FROM PSI THEORY

**The significance of implicit personality systems and implicit testing:  
Perspectives from PSI theory**

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## **Abstract**

Like no other modern personality theory, Julius Kuhl's PSI theory stresses the importance of implicit personality systems like intuitive behavior control, extension memory and positive and negative affect. Kuhl has defended this view against many critiques over the course of more than 40 years of research. As a student of Kuhl, I became convinced that measuring implicit personality systems is of prime importance for Psychology. Kuhl and I constructed the Operant Motive Test (OMT), an implicit motive measure, which is now successfully used in scientific and applied contexts. We learned that individual differences in perception are the key to measuring implicit personality systems. To carry this one step further, I developed a purely visual approach to measuring implicit personality systems. This approach, the so-called Visual Questionnaire (ViQ), is described in honor of the work of Kuhl. Six scales derived from PSI theory were developed by conducting factor analyses using data from more than 70,000 participants. Internal consistencies and test-retest-correlations were satisfactory. Incremental validity of the scales was examined. Results from regression analyses showed that the scales were distinct from self-report scales and could explain additional variances in behavior. Case studies in different domains further indicate the validity. I conclude that implicit personality systems are of great significance, and that a significant contribution to understanding their effects in a wide range of contexts can be made by measuring them on an online platform with a visual approach that is quick, amusing and cross-culturally valid.

**KEY WORDS:** implicit, automatic, intuitive, personality systems interaction, PSI theory, visual questionnaire (ViQ)

Kuhl (2000a) cited Kurt Lewin, the founder of modern Psychology, who once said: “*There is nothing so practical as a good theory*”. I would like to add: there is also nothing more inspiring than a good theory. PSI theory is a good theory – both immensely practical and inspiring. It has guided me now for more than 20 years and brought me to create a methodology and to build up a company that creates value by working with PSI theory. I am grateful to the inventor of PSI theory, Julius Kuhl, and in honor of his work would like to describe in this chapter why I consider PSI theory as both uniquely practical and inspiring.

When I first met Julius Kuhl as my professor in Personality Psychology in 1990 at the University of Osnabrück, the terms subconscious, unconscious and implicit were very unpopular. Most professors and students associated these terms with obscure psychoanalytic theorizing and dissociated themselves forcefully. Kuhl was different. At first, I was very irritated to learn in his lectures about *intuitive* behavior control, the impact of *subconscious affects* and *motives, holistic feeling* and *unwanted intrusions* that unconsciously guide behavior. I thought I was listening to Sigmund Freud from whom Psychology was supposed to be *emancipated*.

But Kuhl described experiments and insisted on empirical studies; so over time I became convinced that the power of subconscious processes is real, and that it is, in fact, the main reason why Psychology is so important. Kuhl was supported by colleagues in the department of Developmental Psychology where I worked for Heidi Keller at the same time on *intuitive parenting*. The working atmosphere in these two strange departments sharing the same floor was exciting. It was also tremendously successful, but it was still a bit crazy for many others in the faculty, who mostly ignored what was going on within the “black box”.

Today, only 20 years later, it is widely recognized that people often rely on unconscious or implicit “intuition” and “gut-feelings”. Daniel Kahneman even won the Nobel Prize in Economics for the experimental analysis that humans rarely behave according to the assumptions of expected utility maximization (Kahneman, 2011; Kahneman & Tversky,

1979). Today, popular philosophy “gurus” run TV shows where they discuss the impact of unconsciousness on our life. Students, professors, marketing professionals and even CEOs with an engineering background today believe in and even give a shrug to the statement that “95% of all human decisions are made subconsciously” (Zaltman, 2003).

What happened? Well, in those 20 years, Psychology was able to document the validity of implicit learning and information processing and to integrate that knowledge into psychological theories. To my mind, Julius Kuhl has been extremely important in this process, not only because of his scientific work but also because he wrote, spoke to and reached a very broad audience comprised of scientists, journalists, students and “ordinary” people interested in Psychology. Versions of PSI theory were published in varying length, from expanded to condensed and from truly complex to easy to understand. But also lengthy books like the textbook from 2010 (Kuhl, 2010) and the “bible” from 2001 (Kuhl, 2001) (thus called by an astonishing number of people I have met) were instrumental in PSI theory’s current popularity, despite never being overly simplistic or reductionist. Indeed, Julius Kuhl may be called a non-reductionistic reductionist.

PSI theory states that human personality can be modelled by the interaction of personality systems (not just System 1 [intuition] and 2 [conscious analysis], as Kahneman (2011) states, but at least four cognitive systems, three motives and two affective systems!). Some of these systems are partly conscious, controlled and rational, while others are more implicit, i.e. unconscious. From this view humans thus are neither absolute rational utility maximizers nor are they driven purely by unconscious forces. People vary in the interactions between these rational and the unconscious systems that are generally seeking equilibrium. It is possible that one system dominates within an individual. Sometimes “coalitions” between two, three or more systems develop and characterize an individual. Some people are driven by the more conscious and controlled systems, but this does not become conscious knowledge to these individuals. The process and equilibrium of personality system interaction is likely

implicit to a large degree and Zaltman's (2003) number of 95% may not be an exaggerated guess.

From Julius Kuhl's PSI theory we can learn that rational-controlled and affective-intuitive systems, whether conscious or subconscious, continuously interact within the human mind and that these interactions often find a stable equilibrium that we call personality. Knowing this, how can we conquer the challenge of measuring personality? Understanding human personality requires techniques for measuring implicit personality systems. Great efforts have been made by Kuhl and his team to find creative solutions in several keen experiments (Bolte, Goschke, & Kuhl, 2003; Baumann & Kuhl, 2003), the Operant Motive Test (OMT, Kuhl & Scheffer, 1999; Baumann, Kazén, & Kuhl, 2010), the Implicit Positive And Negative Affect Test (IPANAT, Quirin, Kazén, & Kuhl, 2009), and self-report measures that were so "projective" that they reached unconscious levels (e.g. the Action Control Scale, Kuhl, 1994). My undertaking of the challenge created a visual test, the ViQ, to measure implicit personality systems. For those interested in seeing how it works, at this point I would like to invite you to take the ViQ test yourself and measure your implicit personality on [www.visualsystem.de/PSI](http://www.visualsystem.de/PSI). Unique aspects of the ViQ are that it is quick (completion in about 5 minutes), online, entertaining and almost non-verbal. This renders the possibility to disseminate the ViQ in a "viral" way and to gather insights about implicit personality systems which otherwise may have gone undetected. In fact, my professional life has been filled with insights derived from measuring implicit personality systems and studying people over long time periods. Some of these insights, gathered together with a great team of entrepreneurs, psychologists, mathematicians and professionals from other backgrounds, will be presented in this chapter.

### System 1 vs. System 2

What many did not understand 20 years ago was that intuitive and affective processes (System 1) help to make decisions in a complex world, because they need fewer

computational capacities compared to conscious thought and occur with little or no awareness (Bargh et al., 1996; Bargh & Chartrand, 1999; Kuhl, 2001; Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). For example, intuitive parenting is cross-culturally of great advantage in interactions with babies for building up a secure attachment (Kuhl & Keller, 2008). Intuition and feeling presumably have also been of great importance during human evolution, which has been characterized by a rapid dissemination of Homo sapiens living in small closely cooperating groups for approximately the last 200,000 years (Chasiotis & Keller, 1994). In these dynamic social and natural contexts, conscious rationality – defined as consistency across different contexts (Kahneman, 2011) – is rarely adaptive and its only use may be to make sense of behavior *after* it is executed (Zajonc, 1980, 1984, 1998). Intuitive processes operate in parallel, are not consciously accessible, are relatively effortless, and therefore cost less energy than controlled processes without necessarily being less effective (Gollwitzer, Fujita, & Oettingen, 2004). Parallelism facilitates rapid response, allows for massive multitasking and gives the brain remarkable power in certain types of tasks (such as visual identification of spouses versus strangers). Parallelism also provides redundancy that decreases the brain’s vulnerability to injury (Camerer, Loewenstein, & Prelec, 2005).

Rational, controlled processes (System 2) occur at special moments when automatic processes become “interrupted,” which happen when a person encounters unexpected events, experiences strong visceral states, or is presented with some kind of explicit challenge in the form of a novel decision or other type of problem which affords extreme computational power (Camerer et al., 2005). Harari (2010) assumes that in human evolution agriculture was the key factor for the development of controlled processes in the human mind. This view is supported – to give a short preview – by the finding with the ViQ that modern academic farmers have the strongest activation of a highly controlled and conscious personality system, i.e. *intention memory*. Without a doubt, conscious analysis can avoid typical weaknesses of intuition, like the inability to perform systematic planning, incorrectly linking statistical correlation to

causation and the tendency to replace difficult questions with easy questions (Kahneman, 2011). Though there is a heated debate about the advantages of intuition (System 1) over conscious analysis (System 2) we may conclude that every human uses, needs and differs in the activation of the two systems (which are, in reality, more than just two according to PSI theory).

20 years ago most people neglected the power of the unconscious systems. For example, economists totally neglected affect, intuition and feeling. Due to the degree that controlled processes are well described by expected utility theory but intuitive processes are not, one could say that the dominating economic models represent the “interrupt” systems important for adding numbers, planning and statistical analysis (Camerer et al., 2005).

This bias had and still has many adverse implications. For example, many products are developed that nobody needs, because market research tends to acknowledge only the rational systems of customers. Many people choose ill-fitting careers, because they are not aware of their implicit motives. And students learn models which are incorrect because they only deal with conscious choices and with making sense of behavior *after* it is executed. As Camerer stated – behavioral sciences have created artificial models were humans constantly live in the “interrupt” modus. The problem is that these models focusing on conscious choice become reality because we can only control what we can measure. Not measuring implicit systems means giving them no place in a modern economy.

One of the biggest challenges in Psychology is to measure personality simply because asking people about their general conscious and rational representations and their specific personality systems will give a picture of a person that is only partially valid (Asendorpf, 2007). As we know, explicit self-reports about personality traits are highly susceptible to response factors like evaluation apprehension, impression management or limitations of introspection (Nisbett & Wilson, 1977). To rely on self-reports almost exclusively may thus be considered a cardinal mistake.



In the world described by Kuhl's PSI theory (2000a; 2001), humans are complex, holistic and integrated beings, in whom implicit, parallel, intuitive and affective systems constantly interact with rational, controlled and conscious systems. This is a striking contrast to the model of "Homo Oeconomicus". It also contrasts with the dual view of the human mind put forward in the System 1 and 2 approach (Kahneman, 2011). We can use PSI theory as an inspirational and practical guide for finding ways of measuring and applying the interaction of implicit and explicit mental systems.

Some of these efforts to overcome the limitations of self-reports took place in the EEG lab. However, measurements of physiological correlates of mental states using the EEG are complex and costly, as I had to learn while assisting Kuhl. But there is another, more efficient road to measuring unconscious systems.

McClelland (1985) asserted that indirect techniques like the Thematic Apperception Test (TAT) are necessary for measuring implicit traits. However, operant tests and other measures of implicit representations were criticized because they failed to satisfy classical psychometric criteria, especially internal consistency and test-retest reliability (e.g. Entwisle, 1972; Fineman, 1977; Tuerlinckx, De Boeck, & Lens, 2002). Therefore, Kuhl and I developed a refinement of these operant techniques (the Operant Motive Test (OMT); Kuhl & Scheffer, 1999; Kuhl, Scheffer, & Eichstaedt, 2003; Scheffer, 2005; Scheffer et al., 2007; Scheffer, Kuhl, & Eichstaedt, 2003). Because the stories written in the OMT were much shorter than in the TAT, inter-rater agreement and reliability of the coding was higher. This resulted in new interest in measuring implicit motives and their connection with personality systems. The OMT has now been validated in a wide range of contexts including cross-cultural development (Chasiotis et al., 2010; Hofer et al., 2008), eating behavior (Job et al., 2010), stress (Schüler, Fröhlich, & Brandstätter, 2009), flow (Baumann & Scheffer, 2010, 2011) and well-being (Baumann, Kaschel, & Kuhl, 2005; Kazén & Kuhl, 2011; Schüler, Fröhlich, & Brandstätter, 2008).

As short as the written texts in the OMT are compared to those in the TAT, the limiting factors in applying these methods remain. They are time-consuming, and, despite all training, attaining satisfactory levels of inter-rater-agreement is still a pain staking endeavor. However, the development and validation of the OMT taught us one lesson: individual differences in perception seem to be the “royal road” to understanding implicit personality systems. The validity of the OMT has demonstrated that the key to the indirect measurement of traits is to understand what the participant has perceived while interpreting ambiguous pictures (Scheffer & Kuhl, 2006; Scheffer & Heckhausen, 2007).

#### The Visual Questionnaire (ViQ)

Long preceding our studies, Hermann von Helmholtz (1925) and Solomon Asch (1946) remarked that visual perception is fully automatic and pre-rational. Its interpretation is largely untouched by explicit intentions. In other words, we are unconsciously driven to see what we want to see. Because part of this malleability of human perception is based on stable individual differences, a visual methodology can provide an easy and robust way of measuring implicit personality systems based on the unconscious preferences of using intuitive and affective as well as controlled and rational processes. Observing individuals as they respond to collative, discrepant, conflict inducing, complex, novel and arousing visual stimuli has high potential for assessing their personality, as Berlyne (1966, p.30) recognized. We will come back to this idea in a moment.

Witkin's research with the Embedded Figures Test (EFT) showed that there were differences in how people visually perceived discrete items in a surrounding field. The perception of “field-dependent” learners is strongly dominated by the prevailing field, whereas “field-independent” learners see items as more or less separate from the field (Witkin et al., 1977).

Schwarzkopf, Song and Rees (2010) found individual differences even in the perception of optical illusions. People with a relatively larger visual cortex reported weaker

illusion strength than people with a smaller visual cortex. People with a larger cortex are more outgoing, explorative and positive than people with a smaller visual cortex. Thus, measuring individual differences in illusion strength may be an interesting test for the sensitivity to positive affect (i.e. Extraversion versus Introversion according to Jung [1923/71]).

The impact of visual information on human perception and decision making can hardly be overestimated. Since humans are “visual creatures” with their eyes being the most important sensory organs, one of the most demanding tasks the human brain has had to perform has always been the processing of visual information. During the course of evolution the primary visual cortex has thus become the single largest structure in the brain with well over 200 million neurons (Palmer, 1999). More than 30 different regions have been identified that contribute to the interpretation of visual stimuli (Gegenfurtner, 2003). About half of the cortex is occupied with visual information processing (Hoffman, 1998). Even other parts of the brain, like parts of the motor cortex, mirror the retinotopic structure of the visual cortex (Barinaga, 1999). All this underlines the predominance of vision within human experience.

Implicit personality systems are mentally represented by images, not words; although the neural images involved in intuitive or affective processing are not necessarily images as we usually think of them (Zaltman, 2003). However, since about two-thirds of all stimuli reach the brain through the visual system, we often experience images, as neuroscientists think of them, visually (Zaltman, 2003). Today the impact of visual information on human perception and decision making is tremendous – for example, in elections (e.g. election posters) – and that influence is unconscious to a significant extent (Frey, 1999).

Considering this, it is not surprising that some personality researchers began to view the study of perception as the royal road to the understanding of implicit personality systems (McClelland, 1985; Murray, 1938; 1943). The perceiver’s personality and motivation is a top-down process which strongly and pre-consciously influences visual perception (Henderson & Hollingworth, 1999; Balcells & Dunning, 2006). Motivation can, for example, lower the

threshold required for the visual system to decide whether it matches an ambiguous figure to a certain favored interpretation. In other words, participants tend to report seeing an interpretation of a figure that fits with their motives, while at the same time failing to recognize such self-serving biases (Balci & Dunning, 2006).

Empirical studies have demonstrated correlations between individual differences in visual perception and various personality traits. For example, Yovel, Revell and Mineka (2005) showed that obsessive-compulsive individuals had a strong perceptual focus on details. Foerster and Higgins (2005) found that dispositional sensitivity to negative affect was associated with local processing, and dispositional sensitivity to positive affect with global processing. Dickman (1985) explained impulsivity in terms of individual differences in the speed, in visual information processing relative to accuracy. Zuber & Ekehammar (1988) found that Psychoticism was negatively correlated with reactivity to a stimuli's meaningfulness. To sum up, empirical evidence suggests that people are to a large extent what they see!

Some researchers in the field of advertising have used Jung's theory and its operationalization by means of an assessment instrument, the Myers-Briggs Type Indicator (MBTI) [see Myers, 1987, for a detailed description of the personality dimensions measured by the MBTI] to systematically relate visual perception to personality (LaBarbera, Weingard, & Yorkston, 1998). For example, according to Jung's theory iNtuitives (N-types in the MBTI) see the big picture and tend to focus upon possibilities rather than the concrete. They perceive objects as they might be and also in their entirety as "gestalt." Conversely, Sensors (S-types) see the "trees" rather than the "forest" and tend to prefer facts that can be collected and verified directly through the senses; a strong attention to details also characterizes these individuals (Blaylock & Rees, 1984; Myers, 1987; Schweiger, 1985). iNtuitives consider future possibilities and make assumptions about information that may not be evident in the

image. Physical aspects of a photograph (e.g., framing, composition, exposure, focus, etc.) play a more important role for Sensors than for iNtuitives.

At least one other Jungian dimension seems to relate to individual differences in perception: Thinkers (T-types in the MBTI) favor analytical stimuli while Feelers (F-types in the MBTI) will prefer stimuli that express interpersonal aspects. Furthermore, emotionally appealing and organic stimuli may be more highly favored by a Feeler type (LaBarbera et al., 1998).

**Table 1.** Equivalent terms for the personality systems measured by the ViQ.

<i>ViQ</i>	<i>C.G. Jung typology</i>	<i>PSI theory</i>
Specific Information Processing (S)	Sensing (S)	Object Recognition System (ORS)
Automatic Information Processing (A)	Intuition (N)	Intuitive Behavioral Control (IBC)
Objective Classification (O)	Thinking (T)	Intention Memory (IM)
Personal Classification (P)	Feeling (F)	Extension Memory (EM)
Need for Stimulation (St)	Extraversion (E)	Positive Affect (A+)
Need for Security (Se)	[Judging (J)]	Negative Affect (A-)

Support for the validity and usefulness of Jungian type theory in advertising and creation of visuals comes from studies that examined the reactions of consumers to a series of copy-only print advertisements (LaBarbera et al., 1998; Yorkston and LaBarbera, 1997). Advertising copy presenting information that was consistent with the personality type of consumers received higher ratings than copy that was inconsistent with their type preferences. In addition, a retailer that was advertised by means of copy congruent with consumers' type received higher evaluations and elicited higher purchase intentions than a retailer that was advertised via copy that was incongruent with consumers' type preferences. This demonstrates that individuals prefer images and advertisements that are consistent with the information-

processing styles that characterize their personality types. For example, images and advertisements that are perceived as realistic, concrete and informative will be evaluated more favourably by individuals with Sensor typologies as compared to advertisements that are perceived as imaginative, conceptual, and abstract.

### PSI theory and individual differences in visual perception

These studies indicate that individual differences in visual perception are valid indicators of personality systems, even their implicit aspects. In PSI theory there is an abundance of hints indicating how visual perception is related to implicit personality systems. Thus, PSI theory has served as my blueprint for development of the ViQ. As mentioned, this neuropsychological informed theory of motivation models personality as a dynamic interaction between personality systems within one person, as well as their perceptual and behavioral significance.

One such interaction refers to self-facilitative behavior, which is assumed to be regulated by the joint effects of a low level “object recognition system” (ORS), which is close to sensing in Jung’s theory, and a high level “extension memory” (EM), which is close to feeling, and down-regulated negative affect. The ORS recognizes objects as single entities in a detailed way. Object recognition entails a figure-ground sharpening mechanism which makes it rigid in the sense that it functions poorly with degraded input. On the other hand, EM is an evaluating and decision-making system based upon high-level intuition. It has extensive connections with a multitude of subsystems within the brain eliciting parallel intuitive-holistic network processing which draws on a broad informational base including a great number of needs, preferences, values and other self-aspects (Kuhl, 2000a, 2001, 2010). Both systems are connected by negative affect. Let us look closely at this process and see what we can learn from PSI theory about the preference and rejection of incongruent visual stimuli.

Incongruent and *collative* stimuli as described by Berlyne (1966) are supposed to be initially associated with negative affect, because they signal potential danger (Scheffer & Heckhausen, 2007). Perception of incongruent objects is transmitted from the ORS to extension memory (EM) as a signal of potential threat. However, since EM is a parallel memory system that integrates the totality of personal experiences, it is able to assimilate incongruent information that the ORS cannot handle or interpret, on the basis of related experiences. Once the incongruent information has been successfully assimilated, the negative affect gets *down-regulated*. However, when negative affect (i.e. arousal) is not down-regulated, which may result from individual differences in the activation of this system, negative affect persists and is translated into consciously accessible negative emotions. These, in turn, trigger avoidance behavior. Down-regulated negative affect elicits a positively experienced emotion, like relief. This is not unlike the concept of negative reinforcement in classical learning theory.

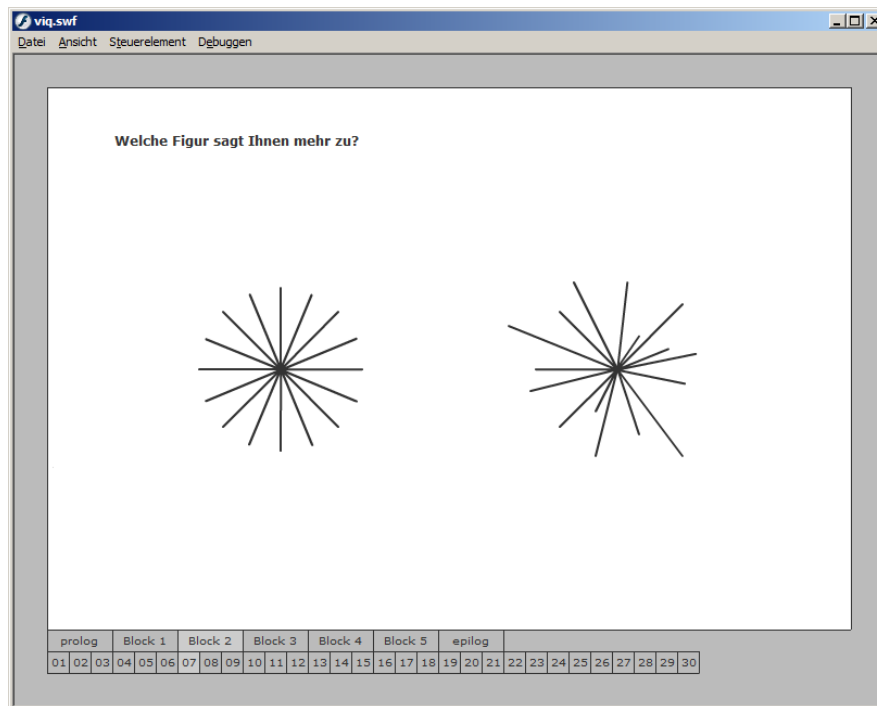
This very brief excerpt of PSI theory already contains valuable hints for constructing visual items for measuring the three personality systems involved in the process of self-facilitation.

1. Avoiding *collative* stimuli is an indication that negative affect persists. Collativity is different from incongruence; it is a signal of diffuse entropy (Berlyne, 1966; Bischof, 1985) which is prior to object recognition. Incongruence, in comparison, means that something is contrary to expectations. Look at figure 1 which may illustrate collativity.

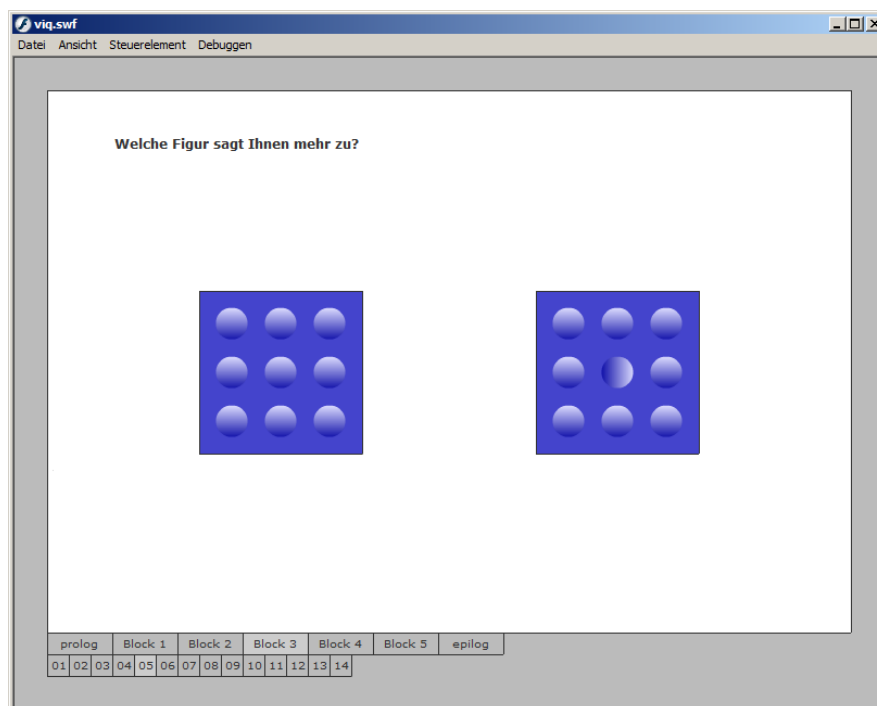
People who prefer more ordered stimuli indirectly indicate that negative affect persists, because a poorly activated EM cannot integrate collativity.

2. Avoiding *incongruence* is an indicator of the activation of the object recognition system (ORS), either because negative affect persists or EM cannot integrate the incongruent object. Figure 2 illustrates an incongruent object on the right side.

**Figure 1:** A more collative visual stimuli is depicted on the right side.



**Figure 2:** A more discrepant object is depicted on the right side.



While the object on the left in figure 2 can be found in reality, the object on the right cannot (look at the middle bubble's shadow which goes unnaturally in another direction than the



shadows of the other bubbles). On an unconscious level, this discrepancy from reality that is contrary to expectations can activate avoidance behavior if the ORS is activated.

3. Finally, a stable activation of extension memory is easy to measure with visual questions. Because of its integrative nature, EM prefers circles and organic shapes over squares and straight lines. Wonderful examples for visual designs which reflect EM can be found in architecture by the work of Gaudi and Hundertwasser.

Another personality system interaction described by PSI theory is volitional facilitation. Again the interaction of three systems is crucial: the low level “intuitive behavior control” (IBC), which resembles intuitive perception in Jung’s theory, and the high level “intention memory” (IM), which includes Thinking as an auxiliary functional component, and positive affect. The IBC has a double function. The first function is an intuitive processing of information, integrating contextual information within and across various modalities. The second function is to initiate action and spontaneous reaction. This dual functionality integrating implicit perceptual with intuitive motor processing is expressed in the term “sensorimotor” processing (Farrer et al., 2003). Like all intuitive systems, the IBC has a rather rough but robust mode of operation which overlooks mistakes and incongruence. Like Piaget's motor sensory schemata, intuitive behavior control entails a form of non-conscious perception that does not involve individual objects extracted from their contexts. Rather, it integrates numerous stimuli within parallel networks that simultaneously support intuitive motor programs. The inter-connected architecture of the IBC leads to a fault-tolerant but sometimes sloppy interpretation of information. Thus the IBC does not interpret high-entropy stimuli as discrepant and threatening like the ORS, but rather disregards mistakes. Obviously this can be disadvantageous in the face of potential threats, and so a further "top-down system," the intention memory (IM), is in place to monitor and regulate the IBC system. The IM serves to inhibit premature or “irrational” intuitive processing and delays automatic responding when difficulties arise – a process called *volitional inhibition* (Kuhl & Kazén,

1999). Intentions that cannot yet be implemented are maintained in the IM, to the effect that they can be enacted later. Only when positive affect interacts with the IM and the IBC, volitional facilitation occurs: Positive affect signals to the other two systems involved in volitional facilitation that the situation is right to execute an intention. Positive affect therefore is very important for action orientation after planning and for creativity (Bolte, Goschke, & Kuhl, 2003).

The term *intention memory* denotes its ability to form explicit representations of intended actions. The most important role of the IM is to inhibit immediate intuitive reactions so as to facilitate planning and analytical thinking which both would be blocked unless premature action is prevented. The IM strongly resembles Kahneman's conception of System 2. As such it may be considered the only truly conscious personality system. The problem is, however, that it is not easy to measure individual differences in the activation of the IM by self-report. People who have a low activation of IM are often not aware of it. When asked if they can inhibit premature and impulsive action, most people tend to say yes.

But again we find valuable advice in the PSI theory for how to construct items for measuring the system involved in volitional facilitation. Unlike the process described above, preferences for visual stimuli are not the correct method for measuring the systems involved in volitional facilitation. Instead we now must ask questions that may be objectively answered with "yes" or "no".

1. Because the inter-connected architecture of the IBC leads to a fault-tolerant interpretation of information, frequently used symbols should be recognized quickly even if they are depicted in an unclear, mistakable way and in a very short time period. As Simon (1992) has convincingly shown, *intuition is recognition*.
2. The key for measuring intention memory should be the process of *volitional inhibition*. Because the most important role of IM is to inhibit immediate intuitive reactions, intuitively plausible but objectively wrong answers are a good test for

the activation of IM. Such items are known from the stroop interference paradigm.

3. An indirect measure of positive affect is not so easy. But as mentioned, Schwarzkopf, Song and Rees (2010) have detected that some people can make optical illusions disappear in their perception, a process that is reflected by activity in the left hemisphere of the brain, a greater visual cortex and a general greater activity and outward orientation. Positive affect signals that a situation is easy. Contextual information can therefore be disregarded and focus on the task at hand is possible.

Based on the PSI theory a large number of different items were developed for the ViQ and then tested. The first criterion for selecting items was based on classical test theory. Every item had to contribute to a satisfying internal consistency (Cronbach's Alpha) of the scale and had to load only on the factor representing this scale in a factor analysis. Over the years 36 items (six items for each scale) have been identified which contribute to an extraordinary high reliability of the scales considering their short length (internal consistencies have been above .70 and often close to .90 in more than 400 groups consisting of approximately 500,000 people of diverse socio-economic and cultural backgrounds). The six-factor structure is replicable for different age categories, for men and women and for different cultures including non-western cultures like China. This is despite the systems involved in either self-facilitation or volitional facilitation are supposed to be moderately correlated. For example, persisting negative affect, activation of ORS and deactivation of EM are supposed to covariate in a threatening situation. However, because the personality system finds an equilibrium this correlation is moderate and therefore the six factor structure of the ViQ is stable. In a sample of 60 participants the scales were also tested for retest-stability, which was above .70 for every scale after a one year time interval between the first and second test.

A first hint for the validity of the ViQ scales were correlations with self-report measures. Self-reports, by definition, measure conscious interpretations of personality

systems which do not necessarily correlate with implicit measures of personality. Even so, a small yet significant correlation can be expected with self-report scales intended to measure the same personality system. Implicit and explicit measures of a personality system should correlate only to a low degree but they are not strictly orthogonal. For example, the explicit achievement motive measured by a self-report and the implicit need for achievement measured by the Thematic Apperception Test are significantly positively correlated – about  $r = 0.20$  (see for example the Meta-Analysis of Spangler, 1992). Correlations between responses to visual items and self-report measures of the same theoretical domain were accordingly predicted to be about 0.20, statistical significant on the 5%-level and in the expected direction for the item to be considered valid.

An even more important validation criterion was the correlation of the scales with theoretical expected behavior. Because behavior is determined by many causes, the expected correlations should also be moderate, i.e. between 0.30-0.60. Validity coefficients of more than 0.60 are extremely rare in behavioral sciences (see Meyer et al., 2001). To summarize, all items used in the ViQ were selected because of a) their theoretical meaning for measuring one of the six scales, b) their basic psychometric properties, i.e. their fit to a six-dimensional factor structure across different populations and cultures, c) their adequate internal consistencies and retest-stability of  $r > .50$  (correlation on item level), d) their significant (albeit low) correlations to a self-report measure of the same personality system like EOS (Kuhl & Henseler, 2004) or the MBTI (Briggs & Briggs Myers, 1995), and e) their correlations with behavior (e.g. volitional facilitation behavior and self-facilitative behavior).

The 36 items that survived this selection process meeting all criteria will now be discussed in regard to their validity for the remainder of this article. These items can be categorized into six distinct types of design-elements. To transform them into complete test-items they were combined with short and simple questions such as:

- Which figure is the most appealing to you?

- The tests in this section show different colors, lines and shapes. Please click on the color, line or shape that appeals to you the most.
- The tests in the following section consist of images that can be interpreted in different ways. After about two seconds the images will disappear and you will be presented with different interpretations. Please choose the interpretation that is closest to what you perceived.
- The tests in this section show compositions of figures that create a visual effect. Please adjust the figure with the plus/minus control only until this effect is no longer perceivable.
- How many colors did the image have?

It should be noted that all questions and items containing colors can be answered on the basis of the design elements' shades of gray. Color-blindness does not have any verifiable effect on the scales of the ViQ.

#### Empirical studies

##### *The six dimensional approach of the ViQ*

The factor structure of the ViQ was analyzed in samples with a total of 76,818 German adults. Because the ViQ is confined to use via the internet all samples had to be online either at home or in computer rooms of the user's respective company or university. The first sample was comprised of 2,405 adults (917 women and 1,488 men) who were involved in various personality development programs. The average age of the participants was 32.81 years (range: 18 to 72 years, SD=10.67). The sample is fairly representative of the German white-collar working population and included clerks, secretaries, managers, designers, sales people, army officers, architects, engineers, teachers and job-seeking unemployed. We called this sample the *white-collar workforce sample*. As discussed below, retest correlations were calculated for a smaller sub-sample where participants completed the ViQ twice with a gap of one year between taking the tests.

The second sample was comprised of 5,650 participants (3,958 women and 1,692 men) who completed the ViQ on a website featuring primarily psychological topics, intended for people interested in exploring their personality. The average age of the participants was 25.48 years (range: 10 to 92 years, SD=10.97). 1,385 of the participants were under-aged (<18). We called this sample the *self-exploration sample*.

68,532 participants completed the ViQ via the website of a large European TV-channel. The channel and its website reach a wide range of the German population including different socio-demographic and educational backgrounds. Because of the channel's privacy policy, it was not possible to collect information on age and sex for this sample. We called this sample the *mass-media sample*.

Principal component analyses with varimax rotation of the factors were used. Items were kept if the absolute value of their structure coefficient was greater than 0.50 for one given factor and lower than 0.30 for all other factors. We used the Scree test and the "Eigenvalue > 1.0" criterion to select the number of factors (Cattell, 1979).

As hoped, six factors that met those statistical criteria could be identified. All of these factors were well-identified, consisting of six items each. Robustness of the factor structure was tested by comparing the final results of the principal component analysis with a principal axis analysis that we calculated from the same data set. I also did this by conducting further EFA using the principal component method for our two other samples. All of these replications yielded satisfactorily similar factor structures (for details see Scheffer & Loerwald, 2008).

The six dimensions are interpreted as scales measuring the implicit personality systems described by PSI theory. However, no single test can meet the demands of measuring all aspects of the complexity of implicit personality systems. Therefore, I chose to give the 6 scales names that resemble the underlying systems.

*Specific information processing (S).* This dimension is related to Sensing (Jung) and using the object-recognition system. A high value in this dimension leads to a quantitative, particularized information intake, a preference of simplicity over novelty and a recognition of objects as single entities in a detailed and structured way. The behavioral orientation based on specific information processing is presumably an advantage when things need to be structured, inaccuracies need to be avoided and mistakes can have highly negative effects. Empirical studies in the past 10 years have shown that members of occupations in military, financial and agricultural industries have higher values in this scale of the ViQ compared to the rest of the population, whereas members of creative occupations (i.e. advertising, marketing) have lower values.

*Automatic information processing (A).* This dimension is conceptually related to Intuition (Jung) and intuitive behavior control (Kuhl's PSI theory). A high value in this dimension marks the preference to approach and the ability to quickly recognize ambiguous, collative and complex stimuli (Bischof, 1975; 1985; Berlyne, 1966). This system encompasses automatic procedures and partly unconscious perception and action programs. Automatic information processing is measured by the precise interpretation of minimal information. This function is also important for quick recognition of symbols and icons. A behavioral orientation based on intuition is presumably an advantage in highly complex and dynamic environments where conscious deliberation of the costs and benefits is too time-consuming. Empirical studies in the past 10 years have shown that entrepreneurs and members of occupations in the advertising, marketing and teaching domain have higher values in this scale of the ViQ compared to the rest of the population, whereas members of IT occupations (developers) have lower values.

*Objective classification (O).* This dimension is related to analytical thinking (Jung) and intention memory (Kuhl's PSI theory). A high value in this dimension marks the ability to quickly detect systematic and logical order in design elements (for which an objective

true/false answer is possible). A high value in this dimension supports behavior affected by foresighted planning, keeping intentions in mind over time and analytical decision-making. Presumably this is always an advantage when planning and also when long-term, planned and serial decisions based on facts need to be made (for example, in stable and predictable environments).

Empirical studies in the past 10 years have shown that lawyers, strategic planners, engineers and natural scientists (including non-academic occupations like chemical assistants) have higher values in this scale of the ViQ compared to the rest of the population, whereas members of occupations in spiritual and social occupations (i.e. clerics, educators) have lower values.

*Personal classification (P)*. This dimension is conceptually related to feeling (Jung) and extension memory (Kuhl's PSI theory). A high value in this dimension leads to an emotional and holistic way of experiencing, good access to stored experiential knowledge and a high interest in social surroundings. This is an advantage when a large variety of information needs to be processed simultaneously, and partly contradictory elements may need integration in a parallel way (for example in social settings with high group dynamics). It is measured by a preference for organic, connecting, episodic, and situative design elements.

Empirical studies in the past 10 years have shown that members of occupations in social and educational sectors have higher values in this scale of the ViQ compared to the rest of the population, whereas members of occupations in "big business" occupations (i.e. auditors) have lower values.

*Need for Stimulation (St)*. This dimension is related to extraversion (Jung) and sensitivity to positive affect (Kuhl's PSI theory). A high value in this dimension is associated with sensation seeking behaviors and a tolerance for high degrees of ambiguity. Need for stimulation is measured by the preference for unusual and challenging stimuli and by the degree to which optical illusions are detected. Empirical studies in the past 10 years have



shown that salespersons have higher values in this scale of the ViQ compared to the rest of the population.

*Need for Security (Se)*. This dimension is related to judging (Jung) and sensitivity to negative affect (Kuhl's PSI theory). A high value in this dimension leads to aspiration for unequivocal decisions, security, norm-orientation and avoidance of blurred design-elements in preference to clear versions of the same stimuli like those used by Berlyne (1966). Discrepancies such as those used in many modern pieces of art are evaluated negatively. Security is established through dealing with potential causes for danger and, should the situation arise, through their elimination. Attention is focused on the problem. Empirical studies in the past 10 years have shown that members of occupations in the military and tax adviser section have higher values in this scale of the ViQ compared to the rest of the population, whereas artists have lower values.

#### *Retest Reliability*

ViQ dimension retest correlations within a sub-sample of the *white-collar workforce sample* (N=30) varied from  $r=.67$  for negative affect to  $r=.91$  for EM. These figures are satisfactory considering the time span of approximately one year between both tests.

Personality systems are not expected to be extremely stable. For example, a wearying life situation will activate negative affect and the ORS and will deactivate EM. This is exactly the pattern we find in chronic diseases (see below). There are even more subtle influences that can have an effect on measurement. For example, closing the right eye while doing the ViQ results in a significant increase of personal classification, i.e. an activation of EM compared to a sample closing the left eye. This is expected, because closing the left eye will result in a larger proportion of visual input being processed in the right hemisphere of the brain, were EM is supposed to be located (Kuhl & Kazén, 2008).

### *Correlates of the ViQ*

In order to show that the approach to measuring personality systems with the ViQ is viable, results from almost 10 years of research will be summarized here. In the previous section, I have already mentioned pervasive differences in the activation of personality systems in different occupations. Now, I will give an overview of how the ViQ is correlated with self-report measures, and how both relate to behavior in different work contexts.

Secondly, I will summarize correlates of the ViQ with behavior in other domains of life.

Kuhl's (1994) measure of action-state orientation and other measures of the TOP diagnostic were crucial for the validation of the ViQ. Because of the fundamentally different approaches of explicit and implicit measures we expected to find correlations of statistical significance in the low to middle range ( $r=.20$  to  $r=.40$ ). In a series of studies, some of which will be described in detail below, it could be demonstrated that all ViQ-scales which are part of volitional facilitation correlate with action orientation. Thus, the more intuitive, thinking and extraverted people are, the more they score on action orientation. The mean size of the correlations is  $r=.30$ . This is, of course, expected from PSI theory and is one hint that the scales of the ViQ measure some implicit aspects of the underlying personality systems and their interaction.

Because the correlations between scales of the action control scale and the scales of the ViQ are of moderate size, we find significant and substantial incremental validity of all dimensions of the ViQ beyond the variance explained by self-reports. Thus, the ViQ scales can add predictive power to explicit self-reports with respect to behavior as assessed by supervisor ratings. I will describe one example in more detail to illustrate this crucial claim.

#### *Incremental validity of the implicit ViQ above explicit self-reports*

36 students from the NORDAKADEMIE University of Applied Sciences (20 women and 16 men) voluntarily participated in an Outdoor-Assessment-Center organized by the Ellernhof Training Center, a provider of outdoor team training, leadership training and

assessment centers near Lüneburg. The average age of the participants was 23.25 years (range: 21 to 29 years, SD=1.48) and the sample was called the *Ellernhof 2006 sample* (for more details and other interesting results found in this study, see Baumann & Scheffer, 2010; 2011).

Participants were administered the ViQ with the other tests a few weeks before participating in the respective assessment center they had volunteered for. They received a link and could complete the ViQ from any PC with internet connection at a time and place of their choosing. The HAKEMP, a German version of J. Kuhl's Action Control Scale (Kuhl, 1994) was conducted in group sessions in class rooms at the Nordakademie using paper and pencil.

We conducted hierarchical regression analyses to examine whether the ViQ can explain variance in behavioral variables that were observed in the above mentioned assessment centers, in addition to variance explained by self-reports. For those behavioral variables where both a self-report and the ViQ could explain part of the variance, we entered a self-report scale in step 1 and the corresponding ViQ model in step 2. Following a recommendation by Aiken and West (1991), predictor variables were standardized before calculating their interaction term. Dependent variables were standardized as well. The results are shown below.

Participants worked on five different outdoor team tasks. One example was *building a bridge on a lake*: Participants worked in teams of 5-6 members and had to use diverse prepared materials they found in the forest nearby. Trained observers who had shown inter-rater-agreement above .80 with outdoor training experts made scores on Behavior Anchored Rating Scales which measured *involvement* in these team tasks. Scores included willingness to participate, willingness to help others, willingness to make suggestions to others, general show of effort and motivation. All these aspects were highly correlated (internal consistencies were above .80) and were therefore used to indicate a general score of involvement.

The ViQ-scale *Need for stimulation (St.)* and *Action Orientation* should both be related to involvement in exciting and sometimes threatening outdoor-exercise where interaction with others is crucial to win. Both scales show a low but significant ( $p < 0,05$ ) correlation ( $r = 0,22$ ).

HAKEMP *Action Orientation* showed a positive association with *involvement* in the outdoor assessment center ( $r = .39$ ,  $p < .05$ ). Also as expected, the ViQ *St.* scale (i.e. Extraversion) showed a positive correlation with *involvement* ( $r = .40$ ,  $p < .05$ ). Because Action Orientation and Need for stimulation are relatively independent, the ViQ can explain an additional variance of  $R^2 = .154$  equaling an increase of 73,38% (Table 2).

**Table 2.** Hierarchical Regression of HAKEMP and ViQ scales on behavioral involvement observed in an outdoor assessment center.

Dependent	n	Step 1:			Step 2:		
		HAKEMP			ViQ		
		Variable entered	$\Delta R^2$	F	Variable(s) entered	$\Delta R^2$	F
Involvement	32	Lop_Hop	.154*	5.45 <sup>a</sup>	ViQ <i>St</i>	.113*	4.47 <sup>b</sup>

<sup>a</sup> $df = 1,30$ .      <sup>b</sup> $df = 1,29$ .

\* $p < .05$

Participants with an action oriented self-concept in the HAKEMP and an implicit need for Stimulation (Sensitivity to positive affect resp. Extraversion) in the ViQ are thus highly involved in the thrilling experience of mastering a challenging outdoor assessment center. This makes sense from the perspective of PSI theory and it demonstrates that the ViQ can contribute to the understanding of the effects of implicit personality systems. The result may be interpreted in the following sense: Both measures are independent indicators of a personality system which is in a positive affective state ready for action. While the ViQ measures the implicit positive affect which is associated with an unconscious need for stimulation, action orientation measures the conscious will to put this need to action. The

smooth interplay between implicit needs and explicit intentions is of prime importance for the enactment of authentic behavior (Scheffer & Kuhl, 2006; 2008).

### Discussion

Across three samples of more than 70,000 participants with diverse socio-demographic background and age it was possible to confirm six well identified and robust factors that consist of visual stimuli. These stable factors enable an implicit approach to personality profiles: Although comprised of only six items each, the scales defined by these factors show quite substantial internal consistencies and retest-correlations reaching .70 or more. This exemplifies a manifestation of the phrase *a picture is worth a thousand words*. Thus, a measure of how individuals process and classify visual stimuli seems to be a promising, efficient and complementary approach to measuring implicit personality systems. Because the six scales can be measured in less than 5 minutes in a way that is attractive to participants, this approach to measuring personality systems can be used outside the laboratory in natural contexts. It also accepts participant diversity in that it does not exclude those who have, for example, reading or writing disabilities or minimal education. This approach is also not transparent to participants and therefore social desirability is neglectable. Over the years of research with the ViQ, I have learned that more than 90% are surprised and sometimes absolutely stunned by the accuracy of their results. Most participants did not understand the mechanics behind the test and were therefore amazed by the validity of the test report and the way it revealed parts about their personality that they were not aware of before.

Research could profit from the ViQ due to the high stability and robustness of this method. As has been mentioned before, the factor structure of the ViQ is stable in very different samples, even in those where participants made the test just for fun. The ViQ also seems to yield reliable results for less educated people and children (though the stability of the result is lower compared to the average testee). Furthermore, recent research indicates that the factor structure of the ViQ is robust across different cultures, and that internal consistencies and

construct validity of the ViQ seem to be stable over different cultures as well. Of course researchers who are interested in conducting studies with the ViQ can use the technology; write me an email and I will send you an access link.

Let me briefly illustrate the ViQ's cross-cultural validity. This was demonstrated by a study in an applied context. Certain brands are preferred by people who are driven strongly by an interaction of intention memory and intuition. Because of their intuitive behavior control, these people prefer strongly reduced, "intuitive" handling and design of products, and because of the objective thinking due to the activation of intention memory they prefer strong, logical and systematic design as well as "rational" arguments for purchasing. Two brands reliably associated with these two personality systems are Apple Computers (although the iPhones less so) and Audi, which means users of these brands have, on average, a significantly stronger activation of IBC and IM as measured by the ViQ (i.e. automatic information processing and objective classification). Our studies demonstrate that even in non-Western cultures like China the ViQ determined strong and highly significant differences in brand-users compared to a control group. McClelland, Koestner, and Weinberger (1989) have shown that there is a need for implicit measures of personality because implicit traits are very important for predicting a wide range of *operant* (i.e., self-initiated) behavior, while conscious traits, measured by self-reports, are more likely to predict *respondent* (i.e., externally controlled) behavior. The difference between operant and respondent behavior largely depends on the degree of control exerted by situational cues (Emmons & McAdams, 1991). Operant behavior is generated in a less constrained way than respondent behavior and occurs in ambiguous unstructured situations, whereas respondent behavior occurs more frequently in structured situations.

Indeed, the strongest correlations between the ViQ and behavior are found in operant behavior. One example for operant behavior is smoking, because for most smokers smoking is an activity which is associated with leisure time and time to let loose. The number of smoked

cigarettes is associated with low positive affect ( $r=-.10$ ,  $p<.01$ ,  $N=989$ ) and low activation of intention memory ( $r=-.07$ ,  $p<.05$ ,  $N=989$ ) (i.e. low need for stimulation and low objective classification). In comparison to the average norm ( $N=100,000$ ) that includes smokers as well as non-smokers, the effect for intention memory is even more evident with a standard deviation of  $z\text{-score}=-.67$ . This is a strong indicator that the effects of implicit personality systems were underestimated in this study because of range restriction in a sample of smokers including no non-smokers. One “implicit motive” behind smoking may therefore be described as follows: smokers aim to recharge their intention memory and regain positive affect, although by a means that is unhealthy and probably not very effective. Of course, other implicit motives may be involved as well. Operant behavior is controlled by the interaction of many personality systems, including cognitive systems, affects and basic needs. But the pattern of low activation of IM being associated with “impulsive” behavior is pervasive, seen again to help explain drinking liquors or not being interested in sustainability and democracy (Scheffer, 2014). Understanding human behavior outside of very structured, determined situations like task performance at work demands the understanding of implicit personality systems. For example, large differences exist between groups of varying activation of implicit personality systems and their needs for vacation. While a strong activation of the ORS and EM is associated with the desire to have vacations in groups, a stronger activation of the IBC and the IM is associated with preference for exclusive resorts (Markgraf, Scheffer & Pulkenat, 2012).

The strong reliance on respondent measures like self-reports has been a great problem in many fields, including management diagnostics. Managers very often work in extremely dynamic and unstructured contexts where self-initiation is crucial and respondent self-reports have low validity (Sarges & Scheffer, 2008; Scheffer, 2013). Measuring the personality systems of managers and other target groups in a non-respondent, implicit and ecologically

valid way should improve our understanding of the highly complex associations between self-initiated behavior and implicit personality systems.

A deeper understanding of implicit personality-system-interactions could also improve support programs for people with chronic diseases (Boecker, Mikoleit & Scheffer, 2014). The objective is to develop global guidelines for communicating with diabetes patients. To this end, we studied approximately 10,000 people with type 2 diabetes in Europe, the United States, South America and China. Over time, people with type 2 diabetes (but not those with type 1 diabetes) developed a personality that is increasingly characterized by greater discipline, less spontaneity and less zest for life. This effect was independent of socio-demographic variables and culture. The study showed that the type 2 diabetes patients' scores for ORS and negative affect were significantly higher and scores for extension memory were lower compared to the norm. This psychological pattern is known in segments of the population that demand showing very high levels of self-control and conscientiousness, e.g. army officers, accountants, and technicians in safety relevant branches. We suppose that chronic diseases influence personality systems through negative reinforcement. The psychological pattern is presumed to be adaptive to a more compliant life style, which reinforces the adaptation of the personality systems to the constraints of the chronic disease. In a different sample of 1,000 persons with diabetes, we were able to show that the communication designed using our knowledge about personality patterns was roughly twice as effective as communication designs based on other approaches.

This may be of relevance for Population Management, because these insights can be used to design, optimize and establish successful interventions for people with diabetes and other chronic diseases – a significant objective for Population Management.

The association of implicit personality systems with operant behavior makes them highly valuable for market research. Among marketing experts there is growing consensus that information overload of consumers is a major reason for products being forced out from



the market. Zaltman (2003) reviews stunning evidence that 80% of all new products or services either fail within six months or fall significantly short of forecasted profits. Such a failure rate of new products means a large waste of resources. The cost of this phenomenon is high – in terms of lost revenues, low customer satisfaction and low employee motivation. Understanding the consumers' psyche has always been the cornerstone of effective marketing and advertising (LaBarbera et al., 1998). Therefore, an easy to use and robust method for measuring implicit personality systems helps to overcome the remarkable neglect of personality variables in consumer research and marketing, an area where socio-demographic variables and sociological concepts like “lifestyles” remain dominant for explaining behavior.

**Figure 3:** Example for a newsletter advertising an electricity provider. The one on the left is stressing personal values, visions and holistic thinking, appealing to people scoring high on intuition and feeling. The one on the right is created in an efficient, logical and visionary way, appealing to people scoring high on intuition and thinking.



One example is the question whether customers and decision makers would be willing to pay more for a service if it is sustainable. Knowing the mean activation level of true

supporters may help to find more effective ways to argue for sustainability. In one study, we found that those people supporting sustainability the most are *not* the ones with a strong activation of extension memory, as one might suppose. Instead, decision makers and customers who support sustainability are more driven by intention memory. Please take a look at the examples in figure 3.

Visual communication designed in the way of the example depicted on the right side of figure 3 will be more effective than the one on the left side to advertise sustainability, because it is more objective and rational. This is rather counter-intuitive and most agencies would do the exact opposite (Scheffer, 2014).

Knowing the “door” to the customer’s mind creates many benefits. However, it also may be used for manipulation.

As an example, because its procedure is based on design elements, consumer profiles created with the ViQ can be easily translated into advertising visuals and product designs that meet the perceptual preferences of the target group on an unconscious level. Using visuals that are consistent with the personality profile can boost advertising effectiveness for good and bad. A recent study conducted in collaboration with the German market research institute GfK demonstrated the validity of the approach. Pairwise comparisons of two advertising concepts – one designed in congruence with the results of the ViQ, the other without knowledge of the implicit personality system of the target group – yielded a preference twice as high for the congruent concept over the incongruent concept.

Working with a PSI theory-based approach to personality helps reduce the consistently high failure rate of new products and saves valuable resources in terms of revenues and profits, customer satisfaction and employee motivation. But it can also be used to encourage people to do things they consciously would not. For example, target groups more prone to “self-infiltration” could be identified (Baumann & Kuhl, 2003). The PSI theory is a powerful

theory and therefore a double-edged sword that must be used in a responsible manner and according to high ethical standards.

To summarize, PSI theory may be considered the most complex yet applicable personality theory so far. Researchers and practitioners have *decades* of work ahead of them for exploring the possibilities to work with PSI theory. The scales described in the EOS diagnostic system of Kuhl alone may be considered as a world cultural heritage. It will be exciting for me and fellow researchers to progress in applying all the described mechanisms and measuring their effects. Thus, the work with PSI theory will proceed and, as I know him, Kuhl will continue to be the motor of that movement.