The Big Five Factor Model in the Context of Resource Valuation: 
A Case Study in Mae Rim, Chiang Mai, Northern Thailand

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1 Introduction
In psychological personality trait theory, the Big Five factor model has proved its usefulness in characterizing subjects’ personalities by considering the five aggregated domains: Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness. Despite ongoing controversies on this model in the literature, it has been validated in many comparative studies across countries, cultures, ages and gender. So far its utilization has mostly been restricted to the contexts of people's job performance and psychotherapy (Caldwell and Burger, 1998; Mastor, 2003; Schmutte and Ryff, 1997). However, it is reasonable to assume that personality traits play also an important role in the context of economic methods for the valuation of environmental resources. Therefore, the aim of this paper is to integrate the Big Five factor model into a study of resource valuation.

2 Theoretical background of personality
2.1 Personality trait theory
Definitions of personality are varied. However, all definitions seem to share common characteristics of personality, including individual differences, behavioral dispositions, stability over time, and that personality can be decomposed into its specific and fundamental parts (Furnham and Heaven, 1999). There are several approaches regarding personality theory, such as the psychodynamic approach, the behavioral and social cognitive approach and the humanistic approach. Unlike other approaches, the traits approach focuses on the quantitative measurement of personality (Solomon, 1994). This feature makes the trait approach suitable for the integration into the field of resource economics. The most influential trait approach today contends that five broad trait factors called the Big Five form the core of personality (Feldman, 2003).

2.2 The Big Five factor model
In 1936, Allport and Odbert were the first researchers to identify the set of words describing personality characteristics in the English language. Their compendium of 4,500 words has been the primary starting point of language-based personality trait research for the last sixty years (Howard and Howard, 2004). Later, Cattell (1946) reported that he had scientifically derived 16 personality traits using factor-analytic and related statistical procedures. He believed that these factors represent the major dimensions for explaining the differences in human personality (Liebert and Spiegler, 1994). However, Fiske (1949) suggested that five, not sixteen, factors accounted for the variance in personality trait descriptors. While other theories of personality are based on psychological theory, one can see from the development of the Big Five factor model
that it is mainly empirically based. Using factor analysis as a main tool, it might be useful to think of the factor models together as a single set of theories that, although very different individually, all fit into one family. Tupes and Christal (1961), Norman (1963), Eysenck (1967), Costa and McCrae (1992) are those who later developed a solid basis for the Big Five factor model. Many studies also confirmed that the Big Five factors emerge quite consistently in different populations of individuals, including children, college students, older adults, and speakers of different languages (Costa and McCrae, 2004; McCrae et. al., 2004; Aluja et. al., 2005). Furthermore, cross-cultural research of the Big Five factors is also supportive (Feldman, 2003).

Each of the Big Five dimensions is like a bucket that holds a set of traits that tend to occur together. The definitions of the five super factors represent an attempt to describe the common element among the traits, or sub-factors, within each bucket. The most commonly accepted buckets of traits are those developed by Costa and McCrae (Howard and Howard, 2004). Extraversion (E) has long been the one of the traits that has appeared in the factor analytic models and is one of the two traits to appear in both the five factor model and Eysenck’s PEN models. According to Costa and McCrae (1992), it is referred to the social adaptability of a person. Neuroticism (N) is the other trait to play a role in most of the contemporary factor models for personality. It refers to the tendency to experience negative affects such as fear, sadness, embarrassment, anger, guilt. Openness (O) refers to how willing people are to make adjustments in accordance with new ideas or situations. Agreeableness (A) is the tendency to have faith in other people and being eager to help them while Conscientiousness (C) refers to the degree to which an individual pushes toward personal goals.

3 The Contingent Valuation Method (CVM)

The various techniques for the valuation of public goods are often classified either into direct and indirect valuation methods or in revealed and stated preference assessment methods. Direct valuation methods are typically based on surveys where people are directly asked their willingness to pay (WTP) for the public good in question. Indirect valuation methods on the other hand try to value public or non-market goods in analogy to market commodities by assessing the cost an individual incurs to utilize these goods (Ahlheim and Froer, 2003). With its ability to elicit both use and non-use values embedded in non-market goods, the Contingent Valuation Method (CVM) is one of the most important direct assessment methods today.

Many CVM studies have investigated the psychological factors by adopting attitudes as a set of variables to explain the WTP stated by the respondents in a CVM interview. However, there are many attitudes that can be tested regarding resource valuation. As is known from the definition of personality, one can assume that similar tastes, attitudes, and also other cognitive factors that might be of interest in the context of resource valuation are embedded in the same personality traits. Many studies (Hawkins et al., 1996, cited in Furnham and Heaven, 1999; Kassarjian and Sheffet, 1991; Brody and Cunningham, 1968) already proved that personality can be systematically related to consumer behavior (e.g. choice, purchase, short-term and long term use of products). Therefore the objectives of this study are to understand characteristics of each of the Big Five factors regarding environmental valuation context in Thai society and also to understand the relationship between the Big Five factors and stated Willingness to Pay.

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1 Total economic value comprises the sum of use and non-use values. Use values may be direct (e.g. by consuming the good, visiting a site) or indirect (e.g. by securing some benefit from the good) a forest, for example, serves both direct and indirect use functions. Visitors to the forest make direct use of it. The role of the forest in protecting the regional watershed would be an example of an indirect use, as would the role of the forest in sequestering carbon dioxide (www.dlr.gov.uk).
4 Methodology
In order to investigate the research issues stated above, a CVM survey was carried out in Mae Rim, Chiang Mai province in Northern Thailand. The chosen valuation scenario consisted of a proposed improvement of the household tap water supply so that the water would be drinkable. In total, 570 interviews were conducted during December 2004 to January 2005. For the WTP elicitation question two alternative question formats were used: Dichotomous Choice (DC) which is a closed ended format requiring the respondent to answer either "yes" or "no" to a proposed payment amount and the Payment Card (PC) where the respondent has to select some payment amount from a given list. The sample was divided into two groups and each group received a different type of question format. The main questionnaire focuses on questions regarding respondents' experience with tap water, the proposed tap water improvement scenario, general attitude questions, and socio-economic questions. In addition to the main questionnaire the respondents were asked to answer the NEO-FFI personality questionnaire developed by Costa and McCrae (1992). The NEO-FFI contains 60 items that measure the five personality dimensions. Each item consists of a specific phrase in the form of a short sentence to which the respondent is asked to state to what degree he or she agrees or disagrees to this phrase. The answers are given on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The 12 items from each dimension are summed to provide a total score for each personality dimension that can range from 5 to 60. Respondents used approximately 30 minutes to complete the main questionnaire and another 15 minutes for the NEO-FFI.

5 Results
Knowing the theoretical definition of each of the Big Five domain, it is also necessary to investigate what those traits represent empirically regarding resource valuation context. To this end, 67 questions which tried to elicit thirteen types of attitude was administered. These attitude types were selected as they were hypothesized to affect WTP. After factor analysis was conducted, we obtained 20 factors. However, only eight factors gave us meaningful results as follows:

Table1: Correlation between the Big Five factors and attitudes

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>N</th>
<th>E</th>
<th>O</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>level of worry regarding public issues</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>level of worry regarding own issues</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>level of satisfaction regarding their own life</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>mental attachment with hometown</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>willing to cut subsidies for public facilities</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>level of interest in surroundings</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>money means happiness</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>saving for the future</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Note: The shaded area means correlation is significant at 0.10 level.

Results from investigating correlation of domains with attitudes that are of interest in valuation survey gave us a hint how those domains can affect WTP consecutively. Table1 indicates that high scorers in neuroticism tend to be unhappy with their life and quite self-centered. However, besides neuroticism, it is difficult to identify other traits according to attitudes in question.

Results from Multiple Regression Analysis from the Dichotomous Choice (DC) survey show that only neuroticism affects WTP positively. That is, the higher level of neuroticism people have the higher possibility for them to accept the bid. This is counter intuition. From our theoretical and empirical definition of neuroticism, which are tendency to experience negative effects, dependent, and being self-centered, it is assumed that people with high level of neuroticism will
state lower WTP. Result from the Payment Card (PC) survey, on the other hand, showed that openness to experience and neuroticism affect WTP significantly.

Results suggest that there are relationships between stated WTP and the Big Five factors. However, some results are counterintuitive and need more specific information for better interpretation. This could be because the Big Five factors is such a broad concept and it might be difficult to show and explain its relation to any single action, which in this case is stated WTP. This difficulty has also been demonstrated in many personality studies that tried to investigate relation between personality and behaviour (Kassarjian, 1991). One suggestion is that instead of trying to find relation between any single action with personality one could aggregate single action into regularities in behaviour, consistent patterns of action, and response tendencies (Kassarjian, 1991). When we compute the average behavioural tendency over repeated occasions, the influence of factors that vary from one occasion to another tends to “cancel out” (Ajzen, 1988). Alternatively, one might investigate into a deeper level of personality (their sub-traits or facets). General domains of personality (e.g., extraversion, neuroticism, etc.) are hypothesized to consist of an underlying hierarchy of more specific traits or facets. Costa and McCrae (1992) theorize that global estimates do not allow much precision in showing which traits are most characteristic of a person or behaviour. Therefore, analysis of lower order personality traits underlying those domains should deepen our understanding of how personality may affect behaviour. To achieve this, in our second round survey, we will select facets that assumed to be related to WTP and test their relation regarding their effect on stated WTP.

References

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