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Learning Style Preferences of Management Students – A Cross-Cultural Perspective –

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Abstract. This paper investigates the relationships between cultural values and the learning style preferences of students. By linking Kolb's model of learning style preferences to the cultural differences of individual learners we develop hypotheses that are tested against data collected from 953 students from 74 different national backgrounds enrolled in management courses at universities in Germany, the UK, the USA, Russia, Ireland, Spain, the Netherlands, Poland, China and the UAE. Our findings show that learning style preferences differ across countries and that these preferences are affected by a number of cultural values. We also find important differences in the learning styles of male and female students and between local and exchange students. The results are of importance to teachers and managers active in the education and development of individuals from different cultural backgrounds and for researchers interested in the influence of cultural values on learning style preferences.

1 Problem and objectives

Understanding the learning style preferences of individuals from different cultural backgrounds is of growing importance to higher education as well as businesses for a number of reasons. In many countries, the number of foreign students enrolled at university has increased over the last decade and this export of higher education services has become an important pillar for many of these countries. According to the UK Higher Education Statistics Agency (HESA), for example, the number of foreign students in the UK has increased by more than 6% to over 600,000 from 2005/6 to 2006/7 (HESA, 2008). Despite more restrictive regulations on student visas the number of foreign students in the US has increased by 6% since 2001 and in 2007 there were almost 600,000 foreign students studying in the US (Schworm, 2008).

In Germany, the number of foreign students has increased by 30% in the same period, and the 246.369 foreign students enrolled in German universities in 2007 account for 14.2% of all students (DAAD, 2008). A similar influx of foreign students has been recorded in other countries, such as France, Australia or Japan (UNESCO, 2008).

A particular increase has been recorded for the numbers of Chinese students studying abroad. In 2007, the number of Chinese students who studied abroad was nearly 150,000 and 200,000 are expected to in 2008 (Ying, 2008). In 2002/3 Chinese students were the largest group of foreign students in the UK and the second largest group in Germany (DAAD, 2008). While English-speaking countries benefit from the spread of English as second language among

students all over the world, non-English speaking developed countries have also seen an increase in the number of foreign students, partially due to the introduction of English language programmes. Additionally, more and more universities have realized their dependency on the income generated from overseas students and started to tap into overseas markets for higher education through distance learning programmes, offering collaborative programmes with local universities abroad, or opening entire campus overseas. For Example, INSEAD opened an Asian campus in Singapore in 2000, the universities of Stuttgart and Ulm established the German University in Cairo in 2003, and the University of Nottingham opened an overseas campus in Ningbo (China) in 2005. Overall, these developments have led to a massive increase in the cultural heterogeneity of universities' student body, challenging them in many ways. Among other challenges, they have to re-think learning support services and to modify curricula and teaching methods in order to enable all students to achieve their learning objectives. Understanding in how far learning style preferences differ across students from different cultural backgrounds is thus of growing importance to universities and teachers whose part and parcel is to support individuals in their learning.

Yet, learning is not only important for the activities of organizations related to Higher Education, but to an ever greater extent to business firms as well. Increasing internationalization requires firms to learn about the economic, political and cultural conditions in different countries and to train their employees accordingly (e.g., Holtbrügge and Berg, 2004). Equally important, generation and transfer of knowledge within (internationally operating) firms has become to be considered as one of the most important tasks for managers (see, for example, Bartlett and Ghoshal, 2002). Learning can arguably be considered to be one of the key elements of this process and thus be seen a central prerequisite for achieving and maintaining competitive advantage in a knowledge-based economy. At the same time, the increasing internationalization of firms means that staff becomes more and more culturally diverse and HR development activities have to be adjusted to match the individuals' preferences if the respective measure is to be successful. For example, many firms introduce global teams consisting of people with different cultural backgrounds in order to enhance creativity and to innovativeness (e.g., Maznevski and Chudoba, 2000; Zakaria, Amelinckx and Wilemon, 2004). While differences in learning style preferences are thus of direct relevance to firms, they are also important considering that learning may not be confined to the employees of the firm; rather, firms may have to ensure that alliance partners, buyers and suppliers, government agencies and a whole range of other

business partners and/or stakeholders from different cultural backgrounds learn about their products, services and organization in general. For example, distributors or sales agents may require training in order to sell a firm's product. Similarly, licensees need to be trained to use a firm's proprietary knowledge in a specific way, which allows all involved parties to maximize benefits from such agreements.

In sum, given the growing diversity of their students, employees, partners, clients, etc. understanding the differences in learning styles of individuals from different national backgrounds is of increasing importance to educational organizations as well as business firms. Only if learning style preferences are known can organizations adapt and select the most appropriate ways of acquiring, sharing and imparting the knowledge which can be seen as crucial to ensuring their survival in an increasingly competitive environment. Given this importance of learning and the fact that it is widely accepted in the intercultural management literature that learning styles may vary from culture to culture, it is surprising that only a small number of empirical studies can be found on this subject. In order to contribute to closing this gap, we empirically analyse the differences in learning styles among business students from 74 national backgrounds and place students of 12 of these countries into a typology of learners suggested by Kolb (1984).

The remainder of the paper is structured as follows. The ensuing section 2 will present the concept of learning styles, its key dimensions 'grasping' and 'transforming', as well as the associated typology of learners by Kolb (1984). Section 3 develops hypotheses regarding the relationship between individuals' preferences for different learning styles and their cultural background. Section 4 explains the methodology and presents the empirical data used for testing our hypotheses. The results of the empirical analysis are discussed in section 5, before we highlight the limitation and some potentially fruitful extensions of the current study.

2 Learning Styles across (national) cultures

So far, there has only been a comparatively small number of studies analysing learning styles across cultures. While these studies have used various conceptualizations of learning styles (see, for example, Jackson, 1995; Ramburuth and McCormick, 2001; Manikutty, Anurandha and Hansen, 2007; You and Jia, 2008), the majority of investigations into how the learning style preferred by individuals varies with the individual's cultural background has used the classification suggested by Kolb (1984; 1976; 1981b). These include the studies by Auyeung and Sands (1996), Barmeyer (2004), Hanisch (2003), Jaju, Kwak and Zinkhan (2002), Lam

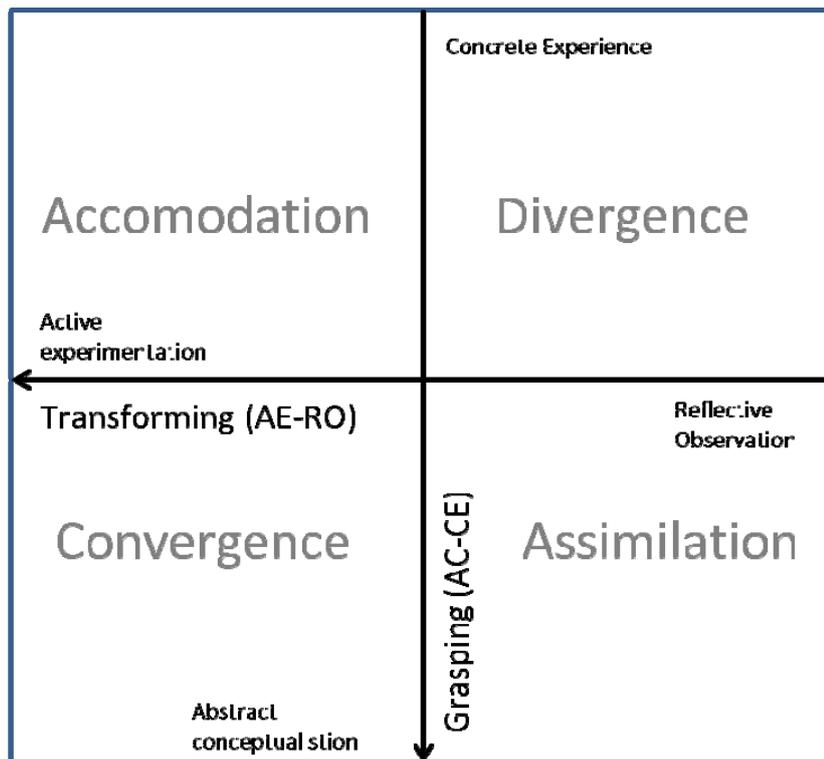
(1998), McKee, Mock and Ruud (1992) and Yuen and Lee (1994). As has been outlined above, the shortcoming of these studies relates to the use of individuals' nationality as a proxy of culture, which our study intends to address.

Kolb's (1984) classification of learning styles is based on the assumption that individual learning can be conceptualized as a circular process consisting of four separate activity stages. This learning cycle starts with the individual making a *concrete experience*. This experience is then reflected upon in the subsequent stage in which the individual learner thinks about possible ways to adequately respond to this situation (*reflective observation*). On this basis, the individual develops mental models to integrate and make sense of the experience (*abstract conceptualization*). These models are then used by the individual to make decisions and solve problems (*active experimentation*). The process results in new further experiences and reflections on these experiences, i.e. the process starts again.

Underlying this learning cycle are two dimensions, that Kolb (1984: 31) saw as necessary for learning: The first dimension '*grasping*' relates to the way in which individuals (prefer to) acquire information. Individuals have a preference for either concrete experience or for abstract conceptualization. Concrete experience (CE) stresses the involvement in experiences, feelings and emphasizes the singularity of specific situations, while abstract conceptualization (AC) refers to theorizing about experience, using logic and concepts, and being concerned with elements common to many experiences in order to arrive at general theories. The second dimension '*transformation*' relates to the way individuals handle information. Kolb (1984) distinguishes between active experimentation (AE) in which the learner stresses practical applications, i.e. 'doing' rather than 'observing'; and reflective observation (RO) in which learners focus more on reflecting on an experience and understanding its meaning. It emphasizes the use of information to increase understanding as opposed to provide practical applications. Kolb (1984) further observed that individuals do not use all of the activities equally, but for each of the two dimensions focus on one of the activities. For the '*grasping*' dimension, individuals will have a stronger preference for either concrete experimentation or abstract conceptualization. Accordingly, the measured preference of individuals for concrete experience is subtracted from the measured preference for abstract conceptualisation resulting in a combined score reflecting the degree of abstractness involved in the acquisition of information. High positive levels for this '*grasping*' dimension thus mean a comparatively higher preference for abstract conceptualization than for concrete experience. Similarly, individuals are assumed to have a stronger preference for either active experimentation or

reflective observation with regard to ‘transformation’ of the acquired information. The measured preference for reflective observation is subtracted from that for active experimentation and high levels of the resulting score thus imply a comparatively higher preference for experimentation than for observation with regard to the *transformation* dimension.

Figure 1 Learning style dimensions and types (Kolb)



This led Kolb (1984) to propose a learning style typology consisting of four distinct learning styles depending on the combination of learning activities preferred by individuals (Figure 1). The first learning style combines concrete experience, i.e. dislike for abstractness when acquiring information, with a preference reflective observations when transforming acquired information. An Individual combining these activities view experiences from different perspectives using divergent thinking and is thus labeled *diverger*. Divergers are seen as imaginative, emotional, people-oriented, and culturally interested. The *assimilator* uses a combination of reflective observation and abstract conceptualization. Based on thorough observations, the assimilator is able to understand a situation through inductive reasoning and developing an integrated explanation the combines the different pieces of information that are acquired. Assimilators are more interested in theories than in people or practical applications. *Convergers* combine abstract conceptualization with active experimentation. They apply their knowledge to examine problems and arrive at solutions in a hypothetic-deductive manner.

The practical application of ideas is thus central to convergers and working on technical problems is preferred to interacting with people. *Accommodators* prefer the combination of concrete experiences with active experimentation. They are good at implementing plans and adjust them to the situation as necessary. Accommodators are risk-takers and solve problems intuitively, instead of relying on theories or mental models. If further information is needed, individuals with a preferences for this learning style would ask other individuals rather than using their own analytical ability.

Based on the expectation that individuals are the product of their cultural background and experiences, several studies have assumed that an individual's preferred learning style will depend on his or her cultural background. Based on their empirical results, McKee, Mock and Ruud (1992) classify accounting students in Norway as assimilators and US students as accommodators. The authors' results confirm the findings of earlier studies of Baldwin and Reckers (1987), Baker, Simon and Bazeli (1986) and Collins and Milliron (1987). In their comparison of learning styles of 632 accounting students in Australia, Hong Kong and Taiwan, Auyeung and Sands (1996) find that Chinese students and in particular Taiwanese students prefer abstract conceptualization and reflective observation styles, while Australian students were more likely to use concrete experience and active experimentation. Chinese students would thus be considered as assimilators, whereas Australian students seem to fit more with the description of the accommodators. While the study by Auyeung and Sands (1996) therefore shows that Chinese students are assimilators, a study by Lam (1998) in which the author used data from 95 salespersons in HongKong shows that 27 of these could be classified as convergers and 34 as accommodators. Thus, in the latter study active experimentation seems to be slightly more important to the Chinese individuals. A similar picture emerged from the results of a study carried out by Hanisch (2003) among the 165 participants of a training program at the Siemens Management Institute in Beijing. 154 of these participants showed a clear pattern and 44.2% were classified accommodators, 30.5% as assimilators, 20.1% as convergers and 5.2% as divergers.

Table 1 gives a short overview of the findings of previous studies in this context. All studies are based on Kolb's (1984) model of Learning style preferences and come to very different conclusion. For example, Chinese are characterized as assimilators in the study of Auyeungand Sands (1996), as accommodators and convergers by Lam (1998) and as convergers and accommodators by Hanisch. Similarly, individuals from the USA are characterized as convergers by McKee, Mock and Ruud (1992), while Jaju, Kwak and

Zinkahn (2002) found them to show the preferences associated with divergers. These contradictory results can be explained by the relative small sample sizes used in these studies. Moreover, these studies do often consider individuals with different background and age. For example, the respondents in the study of Auyeung and Sands (1996) are accounting students, while Jaju, Kwak and Zinkhahn (2002) focus on marketing students. Hanisch (2003) studied the learning style preferences of employees of a large German company in China.

Table 1 Findings of previous studies of learning style preferences

Studies	China	France	Germany	India	USA
McKee, Mock and Ruud (1992) ¹					converger
Auyeung and Sands (1996) ²	assimilator				
Lam (1998) ¹	accomodator, converger				
Barmeyer (2000) ¹		assimilator, diverger	assimilator, converger		
Jaju, Kwak and Zinkhan (2002) ¹				converger	diverger
Hanisch (2003) ²	converger, accomodator				

¹ Cut-off points not stated; ² Cut-off points derived from their own sample.

Overall, while existences studies provide some support for differences in preferred learning styles across cultures, these findings are ambiguous and our knowledge of the learning style preferences of individuals with different cultural backgrounds remains relatively vague. In addition, all of the existing empirical studies can be criticized for equating ‘culture’ and ‘nation’. They have all analysed the differences in learning styles between countries, and infer a relationship between cultural values and learning style preferences only indirectly by attributing certain cultural characteristics to countries. Yet, this has been regarded as problematic for a number of reasons (see, for instance, McSweeney, 2002a). One of these reasons is the internal cultural homogeneity of countries, which cannot be assumed per se. Hanisch (2003), for example, found that the degree of heterogeneity in learning style preferences within the same culture can be much higher than many studies investigating cultural differences across nations would lead us to believe, which may point to cultural differences within countries. As a consequence, this study will look at the relationships between cultural dimensions and learning style preferences, i.e. individuals’ preferences for abstractness of information acquisition and for experimentation in the transformation of this information. However, in order to allow a comparison of our data with the results of existing studies, we will also allocate individuals from 12 countries into the learning style typology suggested by Kolb (1984).

3 Cultural values and learning style preferences

Based on the assumption that learning, as a cognitive process, is culture-bound (Abramson et al., 1996) we develop hypotheses that relate dimensions of culture to the preferred learning styles, i.e. individuals' preferences with regard to the acquisition of information (grasping) and the transformation of this information. While various concepts of culture can be found in research on cross-cultural management (see, for instance, Trompenaars, 1998), Hofstede's (2001) has become the most widely used concept of characterizing cultural values despite criticism leveled at a number of issues (see, for example, Baskerville, 2003; McSweeney, 2002a; McSweeney, 2002b). This criticism ranges from methodological issues to the age of the data. As will be outlined below, the current study addresses some of these issues by collecting data on cultural dimensions from respondents, rather than relying on the data published by Hofstede (2001). While conceptual studies have discussed learning styles against the backdrop of different concepts of culture (see, for example, Yamazaki, 2005), the existing empirical studies analysing differences in learning style preferences across (national) cultures predominantly rely on this concept. Hofstede's (2001) concept of culture consists of five dimensions that are argued to be useful in distinguishing between cultures. In the following, we will link these five dimensions to Kolb's learning styles, i.e. the degree to which individuals prefer abstractness over concrete experience when acquiring information and the degree to which individuals prefer active experimentation over reflective observation when transforming the acquired information.

3.1 Power Distance

According to Hofstede (2001: 29), power distance is related to the "different solutions to the basic problem of human inequality" and reflects the degree to which members of a culture accept or even expect hierarchical differences in social relationships. In a learning context, this would highlight the role of the teacher who is expected to "know" and to be expected to provide the facts. Thus, there is little need for students' own concrete experience (CE) as the "truth" is provided by the trainer/teacher. Similarly, Jaju, Kwak & Zinkhan (2002: 52) suggest that "in high power distance cultures [students] are not expected to seek knowledge actively through their own experiences" while students in low power distance cultures are expected to find their own "intellectual path". The source of information is the teacher/trainer who provides students with the concepts and knowledge that is required and accepted at face value. Thus, the need for students to gather (their own) information through concrete

experience is low, whereas the need to structure and make sense of the information provided by the teacher is high, leading to strong preference of students in high power distance cultures for abstract conceptualization (AC). This in line with Barmeyer (2000: 75) who argues that individuals preferring CE are more likely to engage in discussions and to seek feedback from peers while being less oriented towards their superiors. Based on these arguments we suggest that power distance will be positively associated with a preference for abstract conceptualization (AC) and negatively with a preference for concrete experience (CE). With regard to the dimension “grasping” we thus propose:

Hypothesis 1a: There will be a positive association between power distance and the degree to which individuals prefer abstract conceptualization over concrete experience (AC-CE) with regard to the acquisition of information (grasping).

Similarly, it can be expected that in high power distance cultures students will be used to reflective observation (RO) rather than active experimentation (AE), as the outcome of active experimentation may lead to the socially undesirable result of contradicting the information that is being provided by the teacher. Reflective observation is unlikely to lead to such contradictions. In case such contradictions are perceived they are not explicit and thus do not put into question the trainer and thus do not endanger the power distance between trainer and students that the members of the culture try to maintain. We thus argue that students in high power distance culture are more used to, and have thus developed a preference for, reflective observation (RO) rather than active experimentation (AE). As we thus expect power distance to be positively associated with a preference for reflective observation (RO) and negatively with a preference for active experimentation (AE), we hypothesize:

Hypothesis 1b: There will be a negative association between power distance and the degree to which individuals prefer active experimentation over reflective observation (AE-RO) with regard to the processing/transformation of information.

3.2 Individualism/Collectivism

Individualism is probably the dimension most frequently used to conceptualize differences between (national) cultures (e.g., Triandis, 1995). Hofstede (2001: 209ff.) defines individualism as the degree to which individuals are integrated into groups. In individualist societies the links between individuals are loose whereas the members of collectivist societies

are integrated into strong in-groups which provide protection in exchange for loyalty. In individualist societies values such as independence and achievement of the individual are therefore more important than collective values relating to the well-being of the group. Jaju et al (2002) suggest that teachers in individualist cultures are seen as “guides rather than experts” and the gathering as well as the interpretation of information is the responsibility of the individual and not the teacher. With regard to the ‘grasping’ dimension, Kolb and Kolb (2005) found empirical evidence that individuals with a preference for abstract conceptualization prefer to work in groups, implying a positive relationship between individualism and preference for abstract conceptualization. This may be explained by the fact that abstract conceptualization may lend itself better to individual inquiry than concrete experience, which may require a comparatively higher degree of interaction with other learners and/or work in groups. It is thus likely that students from individualist cultures will prefer abstract conceptualization (AC) over concrete experience (CE). We thus formulate the following hypothesis:

Hypothesis 2a: There will be a positive association between individualism and the degree to which individuals prefer abstract conceptualization over concrete experience (AC-CE) with regard to the acquisition of information (grasping).

Based on the same argumentation we suggest that with regard to the ‘transformation’ of information learners from individualist backgrounds show a higher preference for reflective observation (RO) than for active experimentation (AE). To some extent this is also borne out by the empirical findings of Kolb and Kolb (2005) who found that a preference for active experimentation is associated with a preference for working in groups. This would confirm the argument that learners from individualist backgrounds tend to prefer the potentially more solitary activity of reflective observation over active experimentation. We thus suggest that:

Hypothesis 2b: There will be a negative association between individualism and the degree to which individuals prefer active experimentation over reflective observation (AE-RO) with regard to the processing/transformation of information.

3.3 Masculinity

Hofstede (2001, p. 279) regards masculine societies as characterized by the dominance of “ego goals” such as achievement, competition and assertive behavior over social, feminine

values, such as cooperation and modesty. Kolb and Kolb (2005) suggest that divergers, i.e. individuals preferring concrete experience (CE) are also “interested in people, tend to be imaginative and emotional, [and] have broad cultural interests” (Kolb and Kolb, 2005: 196), which would point towards a dominance of feminine values. Concrete experience (CE) focuses on “feeling” and abstract conceptualization (AC) on “thinking” as sources of information (grasping) (Kolb 1984). A preference for concrete experience (CE) is also associated with high levels of empathy in inter-personal interaction, and feelings are an important element in decision making (Barmeyer, 2000). Similarly, Jaju et al. (2002: 53) suggest that “feminine cultures promote mutual solidarity and hence valuing conceptualization of the social circle rather than reaching for one and only concrete ‘truth’”, although their results with regard to the link between masculinity and a preference for concrete experience are not clear cut. Based on the above arguments we expect femininity to be associated with a preference for CE and masculinity with a preference for AC. We propose that:

Hypothesis 3a: There will be a positive association between masculinity and the degree to which individuals prefer abstract conceptualization over concrete experience (AC-CE) with regard to the acquisition of information (grasping).

The situation is similar with regard to the information processing/transformation dimension of learning styles. Jaju et al. (2002: 53) suggest that “masculine societies prefer concrete and quantitative results, whereas feminine cultures view a problem as a fragmented picture with many solutions. In masculine cultures, the learning comes from the active and assertive role of the individual, whereas in feminine cultures, the learning comes from the reflective view and opinions of other members of the society (e.g., teachers, parents, peers).” They suggest that members of masculine societies will show a preference for active experimentation, although these arguments are not supported by their empirical data. While no information about significance levels is given, the feminine culture (Korea) in their sample shows a higher mean value for active experimentation than the masculine societies (US, India). This result is thus more in line with the Kolb and Kolb (2005: 196) who suggest that assimilators, i.e. individuals with a preference for reflective observation, “are best at understanding a wide range of information and putting it into concise, logical form. [They] are less focused on people and more interested in ideas and abstract concepts”, which appears to be more in line with the characteristics of a masculine society. We thus suggest that feminine values are

associated with a preference for active experimentation and masculine values are associated with a preference for reflective observation. We formulate the following hypothesis accordingly:

Hypothesis 3b: There will be a negative association between masculinity and the degree to which individuals prefer active experimentation over reflective observation (AE-RO) with regard to the processing/transformation of information.

3.4 Uncertainty Avoidance

Uncertainty avoidance refers to the desire of the members of a society to avoid uncertain situations. It is related to the level of stress in a society in the face of an unknown future (Hofstede, 2001). Members of high uncertainty avoidance societies prefer clear structures and regulations that reduce the level of (perceived) uncertainty associated with new and unknown situations, whereas members of societies with low uncertainty avoidance are more willing to accept uncertainty and do not require or even reject strict rules and regulations. Jaju et al. (2002: 53) argue that high uncertainty avoidance is associated with students' being "more comfortable with structured learning situations and concerned with concrete and right answers. Such cultures value the information and knowledge delivered by the instructor and consider it as the best explanation to the problem." However, contrary to Jaju et al. (2002: 53), we suggest that concrete experience requires a willingness to engage in and experience new situations, which – when compared to abstract conceptualization – involves exposure to uncertainty. Therefore, we suggest that the degree to which uncertainty is avoided is negatively related to individuals' preferences for concrete experience (CE) in the acquisition of information. This is also in line with the findings of Kolb & Kolb (2005: 196) who found that convergers, i.e. individuals with a preference for active experimentation (AE) and abstract conceptualization (AC) "[perform] better in situations that call for the generation of ideas, such as 'brainstorming' sessions". We think that only members from low uncertainty backgrounds will enjoy working in such unstructured situations, and abstract conceptualization seems thus to be associated with low uncertainty avoidance. Accordingly, we formulate the following hypothesis:

Hypothesis 4a: There will be a positive association between uncertainty avoidance and the degree to which individuals prefer abstract

conceptualization over concrete experience (AC-CE) with regard to the acquisition of information.

With regard to the information processing facet of Kolb's concept of learning styles we suggest that high uncertainty avoidance leads to a preference for reflective observation (RO) whereas low uncertainty avoidance leads to a preference for active experimentation. As a reason for this association, Jaju et al (2002) suggest that "low uncertainty avoidance societies prefer open-ended and abstract learning situations with formless objectives, broad assignments and less structured schedules. They seek to take risks and find solutions by actively experimenting with the problems." A similar argument is put forward Yamazaki (2005), who highlights the similarity between uncertainty avoidance and reflective observation. With regard to the information processing facet of learning, this conditions are best met by active experimentation (AE), in which students can actively take (risky) decisions in order to solve the problem. Further support for this argument comes from Kolb and Kolb (2005) who found that individuals with a preference for active experimentation are more comfortable in uncertain and unstructured situations. Individuals preferring reflective observation (RO), on the other hand, show a careful and reflecting approach to new things (Barmeyer, 2000), which is more in line with cultures with a high degree of uncertainty avoidance. In sum, we thus suggest:

Hypothesis 4b: There will be a negative association between uncertainty avoidance and the degree to which individuals prefer active experimentation over reflective observation (AE-RO) with regard to the processing/transformation of information.

3.5 Long-term orientation

While Hofstede's (2001) original concept consisted of the four above dimensions, he added the dimension 'long-term orientation' in response to China-based researchers who suggested that the four original dimensions were insufficient to capture the specific long-term orientation which they see as a particular characteristic of the Chinese culture. Long-term oriented societies are regarded to be putting particular emphasis on values that are oriented to the future, such as, for example, perseverance and thrift with less emphasis being placed on values relating to the present (Hofstede, 2001) . Given that the level of concreteness declines with a focus that shifts further onto future and thus increasingly abstract events, individuals with a long-term orientation will be better able and more willing to deal with the abstract and

to a smaller extent rely on concrete experiences. We thus suggest that long-term orientation will be negatively associated with a preference for concrete experience (CE) and positively with a preference for abstract conceptualization (AC):

Hypothesis 5a: There will be a positive association between long-term orientation and the degree to which individuals prefer abstract conceptualization over concrete experience (AC-CE) with regard to the acquisition of information.

Based on the same argument, i.e. the fact that individuals with long-term orientation are less concerned with the past and the immediate present, they will be less likely to engage in active experimentation and prefer reflective observation. We thus suggest the following hypothesis.

Hypothesis 5b: There will be a negative association between long-term orientation and the degree to which individuals prefer active experimentation over reflective observation (AE-RO) with regard to the processing/transformation of information.

3.6 Control variables

While only a small number of studies have analyzed the differences of learning style preferences across (national) cultures, most studies have investigated the importance of a number of demographic factors, such as, for example, gender or age of individuals, for explaining variations in individual learning style preferences. Although the existing empirical findings on the role of these factors remain ambiguous, the theoretical rationales behind influences of these factors on learning style preferences seem convincing enough to include them as control variables into our study design. The factors commonly included in studies on learning style preference of individuals are gender (Auyeung and Sands, 1996; Barmeyer, 2000; Kayes, 2005; Mainemelis, 2002; McKee and Mock, 1992), age (Mainemelis, 2002: 10; McKee and Mock, 1992), discipline and level of programme (e.g. UG vs. PG) (Mainemelis, 2002; McKee and Mock, 1992). Additionally, Kolb (1984) suggests that learning style preference may depend on factors, such as personality type, educational specialisation, career choice and current job role and tasks. As the individuals in our sample were rather homogeneous with regard to the educational specialisation, career choice and current job role and tasks we collected information on individuals' professional experience. Finally, as our sample contains quite a large number of exchange students, we take into account whether or not the student is an exchange student and the length he/she has spent abroad. It may be

possible that adjustment processes have taken place and students have already adjusted their learning style preferences to those styles that are more likely to be useful in their host country's educational context. This is in line with the arguments of Case and Marshall (2004) who suggest that the context may lead individuals to choose different, more appropriate learning styles. However, most of the exchange students in our sample have been abroad for less than a full year, and we think the degree of such adjustments is comparatively low. We nevertheless decided to control for this possibility by dividing the variable that reflected whether or not a student as an exchange student, i.e. 0 for local and 1 for exchange student, by the number of years that the student had already spent in the host country. Thus, students that were in their first year were allocated the highest value of 1, whereas students who had spent more time abroad were allocated lower values, reflecting the potential of adjustment.

Other researchers have suggested that differences in education systems may be one of the main drivers behind differences in learning styles across cultures. McKee et al. (1992), for instance, explain differences in the learning styles between US and Norwegian students by referring to the specific characteristics of the Norwegian education system. While this may be the case, it is very difficult to conceptualize education systems in such a way that would significantly differ from the factors included in this study. If such a conceptualization could be provided, it could also be argued that rather than being a separate determinant of learning styles, this variable would more likely act as a mediating variable between culture and learning style preference.

4 Sample and measures

In order to test our hypotheses, questionnaires were distributed to students of business administration at universities in Germany, the UK, the USA, Russia, the Netherlands, Poland, China and the UAE. Since all students were enrolled in programs that were mainly taught in English, we assumed a good level of English proficiency among respondents we used an English language questionnaire at all locations.

In total, we collected questionnaires from 1044 individuals over the period 2007/2008. A number of questionnaires (91) could not be included in our subsequent analysis as parts of the questionnaires were not filled in correctly. This was the case in particular for the items used to measure Kolb's learning styles which required respondents to rank optional sentence endings (see below). After eliminating questionnaires that were not filled in correctly or completely we had responses from 953 individuals that could be used for empirical analyses. The

students in the sample come from 74 different countries with a majority of 39.7% being German, followed by British (9.5%) and Indian (9.4%) students. The sample consists of 515 (54.2%) male and 45.6 (45.7%) female students. Almost half of the students (399 students or 42.2%) were classified as exchange students, i.e. students that were foreigners in their current country of residence. The age of respondents ranges from 17 years to 50 years, with 25 years as the average age of respondents. On average, the respondents have 2.4 years of professional experience. 456 (52%) of the individuals were enrolled in UG programmes, while 496 (48%) studied for a PG degree.

In order to evaluate the cultural determinants of *individual learning styles*, Kolb's learning style model is used which has repeatedly shown to be a useful and valid way to classify learning styles (Carlsson et al., 1976; Katz, 1988; Kayes, 2005; Kolb, 1984; Kolb, 1976; Kolb, 1981a; Kolb et al., 1984). In order to measure the four dimensions of Kolb's framework we use the Learning Style Inventory (LSI). This was originally developed by Kolb (1976), and after being criticized for its low internal consistency of scales (see, for example, Sewell, 1986), a revised LSI was suggested where short phrases substituted the original single word responses which increased reliability of the measurements. Since then there has been a third modification of the instrument which further increased its validity and reliability (Mainemelis, 2002).

The LSI consists of a number of sentences and four potential endings for each sentence that the individual ranks in line with the preferences. Through combination of the scores for sentence endings the researcher calculates scores for concrete experience, reflective observation, abstract conceptualization and active experimentation. Subtracting the value of concrete experimentation from the value of abstract conceptualization (AC-CE) reflects the student's preference with regard to the acquisition of information (grasping). High positive scores indicate a comparatively stronger preference of the individual for abstract conceptualization than for concrete experimentation, whereas negative scores indicate the opposite. In a similar vein, subtracting the value of reflective observation from the value of active experimentation (AE-RO) reflects the student's preference with regard to the processing of information (transformation). High positive scores indicate a comparatively stronger preference of the individual for active experimentation than for reflective observation, whereas negative scores indicate the opposite. The composite scores for grasping (AC-CE) and transformation (AE-RO) will be used as dependent variables in our models in

order to test our hypotheses and to allocate learners from different countries to one of the learning style types, i.e. accommodator, diverger, converger, or assimilator, explained above.

Table 2 Comparison of cultural values with Hofstede's values¹

	<i>PD</i>	<i>PD-H</i>	<i>IDV</i>	<i>IDV-H</i>	<i>MAS</i>	<i>MAS-H</i>	<i>UAI</i>	<i>UAI-H</i>	<i>LTO</i>	<i>LTO-H</i>
CHI	21	80	81	20	31	66	49	30	39	118
FRA	10	68	84	71	4	43	56	86	55	39
GER	21	35	97	67	24	66	57	65	49	31
IND	26	77	91	48	49	56	39	40	38	61
PAK	12	55	75	14	77	50	55	70	33	0
POL	40	68	80	60	33	64	51	93	45	32
RUS	16	93	76	39	31	36	44	95	36	n.n.
UK	4	35	84	89	46	66	50	35	39	25
USA	10	40	125	91	36	62	18	46	50	29

In order to measure *cultural values* we used the VSM 94² tool, suggested by Hofstede (1994; 2001), which has been used in existing research on cultural values (see, for example, Thomas and Bendixen, 2000). In a first step, we calculated ‘national’ cultural values in line with the procedure suggested by Hofstede. For cultures for which we had 20 or more students – recommended as the minimum sample size per country – we calculated the respective index according to the suggested formulas. As can be seen from Table 42, the values calculated on the basis of our data differ in some cases significantly from the values calculated in Hofstede’s original study. This may be due to a number of reasons, including the potential change of cultural values over time as Hofstede’s data has been criticized for being out-dated. For example, some authors suggest quite dramatic shifts with regard to the degree of individualism in Asian countries (Auyeung and Sands, 1996). Other possible explanations include the small sample sizes in some cases or various problems associated with the reliability and validity of the VSM 94 instrument (see, for example, Kruger and Roodt, 2003; Spector et al., 2001).

Partially as a consequence of these ambiguous findings but also in order to allow for testing our hypotheses, we used items contained in the VSM 94 tool to calculate values on the individual level. However, as the VSM 94 has been developed to compare the mean values between countries, the guidelines accompanying the VSM 94 with regard to the combination of items into the 5 dimensions could not be used. Instead, we carried out a principal

¹ PD-H, IDV-H, MAS-H, UAI-H, LTO-H are from Hofstede’s original IBM study or taken from subsequent studies as presented in Appendix 5 in Hofstede (2001).

² In the meantime, an up-dated version of this questionnaire (VSM 08) has been made available (<http://stuwwww.uvt.nl/~csmeets/VSM08.html>).

component analysis of the VSM 94 items. The Kaiser-Mayer-Olkin measure of sampling adequacy (KMO) fell into the ‘meritorious’ band (0.831) This resulted in the identification of six factors that had an Eigenvalue greater than 1, of which we interpreted five to broadly resemble Hofstede’s five dimensions. The sixth factor was related to a single item and discarded. In order to measure our control variables, the questionnaire also included questions about age, gender, nationality, years of professional experience, degree programme, level of programme (UG/PG) and years spent in their current country of residence (if foreign).

5 Results and Discussion

5.1 Descriptive results

Table 3 shows the *learning style preferences* for individuals from 12 countries. Although we have collected data from 74 countries, for the descriptive analysis we only used countries for which we had more than 15 respondents.

Table 3. Learning styles for 12 countries

	CE	RO	AC	AE	Grasping^a (AC-CE)	Transforming^b (AE-RO)
BUL	28.45	27.64	32.45	31.45	4.00	3.82
CHI	28.60	29.72	31.19	30.48	2.59	0.76
FRA	27.77	29.77	32.12	30.35	4.35	0.58
GER	25.49	28.03	32.00	34.48	6.51	6.45
IND	26.49	28.64	33.24	31.63	6.74	2.99
NIG	24.75	30.75	32.06	32.44	7.31	1.69
PAK	27.91	29.74	32.03	30.31	4.11	0.57
POL	26.79	27.79	33.65	31.76	6.85	3.97
RUS	29.65	28.41	31.06	30.88	1.41	2.47
TAIW	26.85	29.92	33.38	29.85	6.54	-0.08
UK	27.62	27.69	32.21	32.48	4.59	4.79
USA	26.05	29.10	30.15	34.70	4.10	5.60

^a Preference of individuals for abstract conceptualization over concrete experience with regard to the acquisition of information (grasping).

^b Preference of individuals for active experimentation over reflective observation with regard to the processing of information (transformation).

The descriptive analysis reveals several remarkable differences between the 12 countries. The highest values for the ‘grasping’ dimension can be found for Nigeria, Poland and India, while Russia and China show the lowest values. Germany and the USA score the highest on the ‘transforming’ dimension. Here the values for Taiwan, Pakistan, France and China are the lowest. Thus the basic assumption of this study that learning styles are culture-bound is supported by our descriptive data.

Figure 2. Average learning style scores for 12 countries (cut-off points derived from own sample)

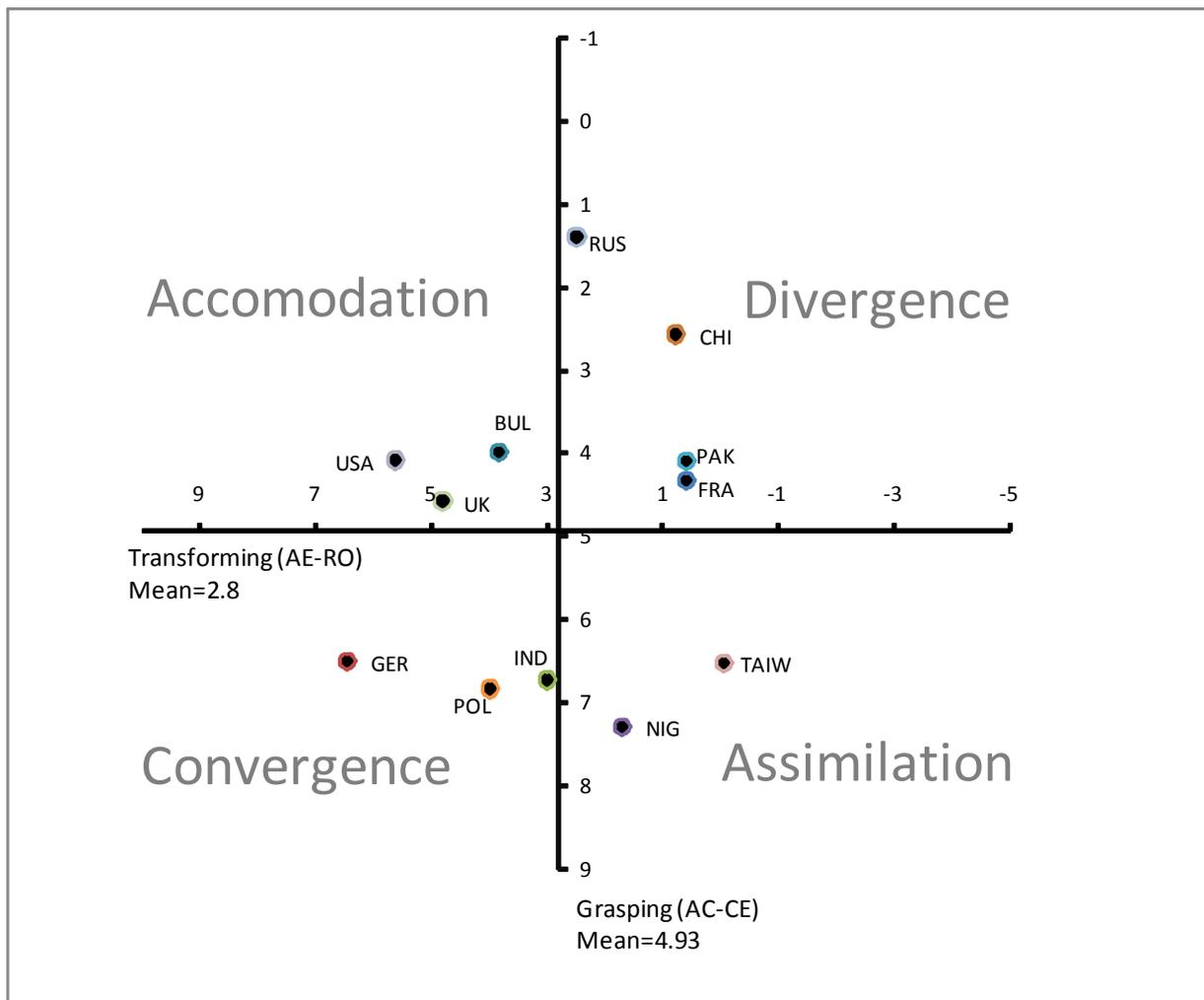


Figure 2 presents the mean of individuals' learning styles for 12 countries. The x-axis shows the level of "transforming" (AE-RO) and the y-axis shows the level of "grasping" (AC-CE). The axes cross at the mean values of each of the dimensions as calculated on the data in our sample.³

5.2 Hypotheses testing

In many studies on cross-cultural differences and their effect on learning style authors have focused on specific nations and thus used categorical variables for the independent variable. In consequence, the influence of culture on learning style preference is investigated by comparing the mean values for the learning style dimensions across nations. While some authors merely provide the mean values for the respective cultures without any indication of

³ In previous publications, Kolb and colleagues (see, for example, Yamazaki, 2005) have suggested different normative values for the cut-off points, i.e. the point where the two axes should cross each other. Since we think that these normative values are not useful for classifying a culturally heterogeneous sample, we follow Auyeung and Sands (1996) and calculate the cut-off points on the basis of our own data.

the statistical significance of these differences in mean values, other authors use t-tests of differences between mean values, MANOVA or multidimensional scaling to provide information about the statistical significance of the differences in learning styles between (national) cultures (see, for example, Barmeyer, 2004; Jaju et al., 2002).

In this study, we use regression analyses, and unlike existing empirical studies on this subject decided against combining individuals into categorical (country) groups. Rather, we focus on the individuals' values as measured by factors extracted from Hofstede's questions and use these as predictors of the four learning activities as outlined in our hypotheses. In order to test our hypotheses we computed a regression model for each of the two learning styles grasping (AC-CE) and transforming (AE-RO). These two regression models which also include our control variables are shown in the following Table 4.

Table 4. Values and learning style preferences

	Grasping (AC-CE)	Transforming (AE-RO)
Cultural values		
Power distance	.031	.001
Individualism	-.058*	-.088**
Masculinity	.048	-.061*
Uncertainty avoidance	.079*	.024
Long-term orientation	.027	.053
Control Variables		
Gender	-.047	.087**
Age	.039	-.031
Professional experience	-.025	.071
Exchange	-.051	.119**
F	2.181*	4.255**
R² adj.	.011	.030
Durbin-Watson	1.900	2.005

N=953; **p≤.01, *p≤.05

The Durbin-Watson statistics show that multicollinearity was not a major concern in any of the regression models. Both models are statistically significant, as indicated by the F-values and the respective significance levels. The determination scores show that the percentage of explained variance in the dependent variables' range are very low; yet, it has to be borne in mind that the objective of this study is the identification of cultural influences on the learning style preferences, rather than providing a best-possible explanation for the variance in learning styles. This likely under-specification of the model is thus accepted and will be further discussed in the limitations section below.

In our *first hypotheses* we suggested that power distance will influence the degree to which individuals prefer abstract conceptualisation over concrete experience and active

experimentation over reflective observations. The results show that neither individuals' scores for grasping (AC-CE) nor their scores for transforming (AE-RO) are associated with the level of power distance on a statistically significant level. There is thus no empirical support for our hypotheses 1a and 1b. In *hypothesis 2a* we suggested a positive association between individualism and the degree to which individuals prefer abstract conceptualization over concrete experience when learning. While the respective coefficient in our model is statistically significant, contrary to our expectations the sign of the coefficient is negative (-.058, $p \leq .05$). With regard to *hypothesis 2b* the expected relationship is supported by our empirical results. The data show a negative and statistically significant association between individualism and the degree to which individuals prefer active experimenting over reflective observation.

In *hypothesis 3a* we argued for a positive relationship between masculinity and individuals' preference for abstract conceptualisation over concrete experience. Our empirical findings fail to support this hypothesis as the respective coefficient, though positive, is not statistically significant. *Hypothesis 3b* suggested a negative association between masculinity and individuals' preference for active experimentation over reflective observation. As the respective coefficient is negative and statistically significant (-.061, $p \leq .05$), hypothesis 3b is supported by the data. In *hypothesis 4a* we expected a positive relationship between the level of uncertainty avoidance and the degree to which individuals prefer abstract conceptualisation over concrete experience. Our empirical findings support this hypothesis with a positive and statistically significant coefficient for this relationship (.079, $p \leq .05$). There was no empirical support for *hypothesis 4b*, which suggested a negative association between uncertainty avoidance and individuals' preference for active experimentation over reflective observation. The respective coefficient is neither negative nor statistically significant. There is thus no empirical support for this hypothesis and the result also contradicts Hoppe's (1990, cited in Yamazaki, 2005) findings that show a negative correlation between uncertainty avoidance and the AE-RO score. The final two *hypotheses 5a and 5b*, which relate long-term orientation to the learning style preferences, were not supported by our data. Neither of the coefficients is statistically significant.

With regard to the included control variables, there are a number of interesting findings. As Table 4 shows, *gender* is of statistical significance in our second model explaining individuals' preference with regard to the processing of information when learning. The findings suggest that male students have a comparatively higher preference for active

experimentation over reflective observation than female students. While existing studies have not detected any evidence for gender effects on preferences with regard to information processing (see, for example, Auyeung and Sands, 1996; Kayes, 2005), Mainemelis (2002: 10) found that men have significantly stronger preference than women for conceptualizing when acquiring information as part of their learning. However, there is no evidence for such a difference with regard to the information acquisition between male and female students in our sample. We included *age* as our second control variable, as this variable has been suggested to influence learning style preferences (see, for example, Kayes, 2005). Yet, similar to the results of existing studies, such as, for example, Auyeung and Sands (1996) or Mainemelis (2002: 15), we did not find any significant difference in learning style preferences based on age. As a third control variable we have included the *professional experience* of the participants. In line with McKee, Mock and Ruud (1992) there was no empirical evidence for an influence of professional experience on learning style preferences among our respondents. An explanation for this may be that only few respondents in our sample had significant professional experience.

The fourth control variable that was included was the status of the student, as being either a local student or a foreign exchange student. Because of potential adjustment effects we also took into account the period that *exchange students* had already been in the respective host country. Our empirical results show a highly significant, positive effect of this control variable on individuals' preferences with regard to both transformation and processing of information. More specifically, exchange students seem to have a higher preference for active experimentation over reflective observation than their local fellow students. This seems plausible in as far as studying in a foreign country can be seen as a manifestation of this active experimentation as opposed to learning about a foreign culture from one's home country through reflective observation.

In addition to these four variables that have been included in our models we gathered data on other characteristics that have been investigated in their role for learning style preferences in the extant literature. One of these variables is the *level of studies* of respondents, i.e. whether they are undergraduate or postgraduate students. Kayes (2005), for example, found higher AC scores among graduate students than undergraduate business students. However, the PG students in his sample were employed full time and he suggest that differences may have been due to the work demands faced by PG students. Based on this finding we tested for differences in the learning styles preferences between UG and PG students (not in our model).

In line with the findings of Kayes (2005), the AC scores for PG students was higher than for UG students and this difference was statistically significant at the 1%-level. In addition to Kayes (2005), we also found that the AE score was lower for PG than for UG students, again on a statistically significant level. Auyeung and Sands (1996) used the *year at university* as control variable in their investigation of cross cultural differences in learning style preferences but did not find a significant effect. Running this analysis for our sample did not provide a statistically significant effect either. Finally, Mainemelis et al. (2002) distinguished between *full-time and part-time students*, but did not find a difference. A test of the role of this distinction for learning style preferences did not reveal any significant findings either, which might be explained by the fact there were only 48 part-time students in our sample.

6 Contribution, Limitations and Implications for Future Studies

By analyzing the relationship between cultural values and learning style preferences of 953 students, our study contributes to research and practice in several ways. First, our results show that learning style preferences differ across countries and our data allowed us to attribute 12 countries to specific learning style types. Secondly, the study provides evidence that some cultural values can affect learning style preferences of students, while other facets do not seem to have an impact. In particular, the study reveals a negative influence of individualism and a positive influence of uncertainty avoidance on the preference for abstract conceptualization over concrete experience. Individualism and masculinity have both a negative effect on the preference for active experimentation over reflective observation. The study also highlights the differences in learning style preferences between male and female students on the one hand, and between local and foreign exchange students on the other hand.

These findings are of importance for practice in a number of ways. First, the fact that the learning style preferences of an individual depend on his or her cultural background question the potential for, and the desirability of the convergence of education systems which – in Europe – has been triggered by the Bologna declaration. If individuals from different cultural backgrounds have different learning style preferences, a one-size-fits-all model might be unlikely to help students achieving the required learning outcomes. Similarly, the provision of training and teaching activities in countries with different cultural backgrounds has to take into account cultural differences. This applies to foreign branches of universities, curricula transfers, faculty exchange and other forms of internationalizing higher education.

A second implication refers to the growing cultural diversity of student cohorts. International exchange programs and the worldwide recruiting of students lead to culturally diverse classes in which individuals may differ significantly with regard to their preferred learning styles rendering pedagogical approaches geared towards single learning styles ineffective. Instead, educators may, for example, consider adopting 'cafeteria'-style systems that allow students a choice of different ways of acquiring/testing new knowledge and to select the one that matches their learning style. Diversity of learning styles might also be addressed through the increased use of learning in groups in which students are made aware of existing differences in learning styles and are enabled to build on these differences in a synergistic way in order to enhance the overall learning experience of the group. Large universities might consider splitting student cohorts and employing different pedagogical methods reflecting different learning styles of sub-groups. However, we would caution against such an approach on the grounds that although individuals' may show a preference for a specific learning style, most research shows that students are often multimodal (Peters, Jones and Peters, 2008). Such an approach would also prevent students from benefitting from a diverse learning environment, which in itself contributes to the students' learning experience

Although the participants in this study are students, many implications can be transferred to business firms as well. For example, different learning style preferences have to be considered when designing personnel development programs for foreign subsidiaries. Moreover, the preference of exchange students for active experimentation over reflective observation may be prevalent also for headquarters expatriates in foreign subsidiaries as well as for subsidiary inpatriates in the headquarters. Our support for the special, and potentially dynamic nature of learning style preferences contributes to existing research into the importance of learning style preferences for the adjustment of expatriate and inpatriate managers (Harvey and Miceli, 1999; Yamazaki and Kayes, 2004). Our findings are thus highly relevant for the design and provision of intercultural training programs for expatriate and inpatriate managers. Similarly, our results should be considered when selecting members of, and designing training programs for global teams, i.e. teams with a high degree of cultural diversity (Harvey, Novicevic and Garrison, 2004).

There are a number of limitations that need to be taken into account when interpreting the results of this study. First, it has to be noted that the percentage of explained variance (adj. R^2) was very low in both of our models. This was accepted given that our focus was on the influence of specific cultural facets on learning style preferences rather than explaining

differences in learning styles per se. If the explanation of the variance in learning style preferences is used as a criterion, our models are clearly underspecified. I.e., the low levels of explained variance imply that other factors have a greater influence on learning styles than the cultural variables included in this study. For example, Kolb (1984) suggests that learning style preference may depend on personality type, which we did not emphasise in this study. This may have had a negative effect on the magnitude of the explained variance of our models and future studies on this issue should control for personality types when empirically investigating the determinants of learning style preferences.

A second set of limitations relates to the ways of measuring the key variables in this study. First, the LSI has been criticized for having limited test-retest reliability (e.g., Freedman and Stumpf, 1978). This means that there can be significant unexplained variation in the four learning measures when an individual subject is tested and retested after a short period of time (McKee, Mock and Ruud, 1992). This criticism, however, has been made about several other widely used learning style instruments as well, and is, therefore, probably a characteristic shared by many cognitive style instruments (Sewell 1986). Related to this concern is the relative low internal consistency of the LSI scales. Nunnally (1978) recommends that only item-batteries with Cronbach's alpha of .50 and above should be used for hypotheses testing. While in most single-country studies these coefficients lie far above this level, in our study the respective values were CE .70, RO .67, AC .76 and AE .71. Future studies may be able to increase the reliability by translating the questions into the language of the participants (see, for example, McKee, Mock and Ruud, 1992). The issue of different languages has also been highlighted by McKee, Mock and Ruud(1992: 336) who investigated the differences in learning styles between US-American and Norwegian students. They found that "Norwegian learning style preference measures obtained via a Norwegian language instrument were significantly different from those obtained via an English language instrument, even though the Norwegians were all judged to be fluent in English". The authors thus suggest caution when "interpreting the results from English language instruments administered to foreign nationals, even where the subjects are fluent in English". It also has to be borne in mind that the LSI gathers individuals' preferences for learning rather than their actual learning styles. While it may be assumed that there is a close relationship between these two variables, this cannot necessarily be taken as a given. Finding out about the actually used learning styles of students would require different methodological approaches and information not only from the individual, but also from teachers, etc.

With regard to the measurement of the cultural dimensions in our study, the used instrument (VSM 94) has been criticized on various grounds (Kruger and Roodt, 2003; Spector, Cooper and Sparks, 2001). While we have tried to minimize these problems, by carrying out a principal component analysis of the items suggested by Hofstede (1980) in order to arrive at more reliable measures, there remains scope to improve measures of the respective dimensions. A more fundamental problem relates to the ability of catalogues of dimensions, such as the one proposed by Hofstede or other researchers (see, for example, House et al., 2004), to adequately capture the complexity and richness of cultural values.

Moreover, it has to be taken into account that our sample consists of students in business administration, only. Several studies reveal that students of other subjects may show other learning style preferences. For example, it may be assumed that the preferences for concrete experience reflective observation, abstract conceptualization and active experimentation differs between students of business administration and those of history, medicine, art and engineering. Finally, it is debated in the relevant research whether or not learning style is a “fixed trait or dynamic state” (Kolb and Kolb, 2005: 199). Preferred learning styles may change over time and/or vary with the specific context of learning. Mainemelis, Boyatzis and Kolb (2002) also suggest that a balanced use of all four learning styles leads to a wider space for flexible adaptation and development of learning skills. Thus, in order to investigate such changes and modifications of individuals’ preferred learning styles, empirical investigations may adopt longitudinal research designs. While existing studies have focused on the differences in individuals’ learning style preferences and explaining such difference, further research is warranted into the consequences of learning styles in different learning situations and contexts.

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