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Cultural Modelling: Literature Review

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Abstract

This project explores the impact of culture on goal-oriented behaviour within a gaming environment. Culture consists of values, rituals, heroes, symbols, and behavioural practices and can be differentiated using five cultural dimensions (Hofstede, 1991; cited in Dahl, 2005). These are power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation.

Establishing how cultural diversity can be better represented within a simulation environment requires certain elements. The literature suggests several modelling techniques and requirements related to psychological fidelity. For the purpose of this project, developing a methodology to ensure that agents' goals are consistent with their culture and showing differential impact of culture on people with differing status are critical. The proposed approach for modelling culture includes components related to the status of individuals, and the strength of the cultural dimension in play. In representing the impact of culture, a good model would also show agents to react differentially to external events (e.g., an economic downturn). The proposed methodology for incorporating culture into the simulation environment as well as recommendations for a longer term project is presented.

Résumé

Le présent projet traite de l'incidence de la culture sur les comportements orientés vers un but dans un contexte de simulation. La culture recouvre les valeurs, les rituels, les héros, les symboles et les modes de comportement. Cinq dimensions permettent de distinguer les cultures (Hofstede, 1991; cité dans Dahl, 2005) : la distance hiérarchique, le contrôle de l'incertitude, l'individualisme, la masculinité et l'orientation temporelle.

Si l'on veut déterminer comment mieux représenter la diversité culturelle dans un cadre de simulation, on doit disposer de certains éléments. À cet égard, la littérature propose plusieurs critères et techniques de modélisation qu'elle associe à la fidélité psychologique. Pour les besoins du présent projet, il est essentiel, d'une part, d'élaborer une méthodologie permettant de faire en sorte que les objectifs des sujets soient compatibles avec leur culture et, d'autre part, d'illustrer la variabilité des effets de la culture sur les individus de conditions différentes. La démarche proposée pour la modélisation de la culture comprend des éléments liés à la situation des individus et à la puissance de la dimension culturelle en jeu. Un modèle qui réussirait à bien illustrer l'incidence de la culture montrerait également la variabilité des réactions des individus à des événements extérieurs (p. ex. un ralentissement économique). La méthodologie proposée pour intégrer la culture dans le cadre de simulation est également présentée, de même que des recommandations relatives à un projet de plus longue durée.

Executive Summary

Adams, B.D., Sartori, J.A., Waldherr, S. 2006. Cultural Modelling: Literature Review. CR2006-190, Defence Research and Development Canada - Toronto.

Past research on crowd behaviour using computer models of human behaviour have been limited in that they only model prototypical behaviour and do not consider cultural influences. This project attempts to model culture within a gaming environment by identifying salient characteristics that are common to all cultures but yet differentiate these cultures.

Although there are a number of determinants of the goals that individuals adopt including individual status, family, politics, and national culture. However, this project focuses primarily on culture, as the role of culture has been very underemphasized in computer models. A number of alternative definitions of culture have been suggested in the literature. Hofstede (1991; cited in Dahl, 2005) proposed that culture consists of values, rituals, heroes, and symbols, with behavioural practices extending across all the layers of a culture. Hofstede (1980, 1994; cited in Hofstede & Hofstede, 2005) developed a model relating to cultural patterns that can be used to distinguish among different cultures. The model defines culture based on five dimensions. These are power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation. Although Hofstede's work has been recognized as a mammoth accomplishment for the social sciences (e.g., Bond, 2002), it has also been criticized for several theoretical and methodological shortcomings (e.g., McSweeney, 2002). Other research, however, has found strong support for Hofstede's work and its ability to predict human behaviour (e.g., Volkema, 2004).

Establishing how cultural diversity can be better represented within a gaming environment is complex, but the literature suggests various approaches to modelling complex goal directed behaviour that have been used in past research and application (e.g., Poznanski and Thagard, 2005) as well as several requirements related to psychological fidelity. For instance, attention to intra-agent consistency, inter-agent consistency, as well as contextual effects (Bedner & Page, 2005) would be necessary to accurately model human behaviour. However, our survey of the culture and the gaming literature (as well as discussions with the Scientific Authority) helped to identify specific requirements of the cultural modelling approach in this project. The first requirement is that individuals within the modelled environment should behave in a way that is as consistent as possible with their cultural background. Second, agents within the same context should differ in their goals and behaviour and should ideally, show progression over time. Third, it would be necessary to create a methodology that enabled agent responsiveness to external circumstances.

The proposed approach required several steps. First, individual status/need was defined in terms of a set of prototypical goals. These goals were derived from Schank who divided goals into four different types-satisfaction goals, enjoyment goals, achievement goals and preservation goals (Eiselt & Holbrook, 1998). Of course, high need people would have different goals than would low need people. Modelling culture, however, would require being able to depict multiple people, each with somewhat different goals. One way to do this would be by profiling of the demographics of the target country in order to ascertain the "baseline"

status of people within the country and understanding other relevant cultural indicators, such as customs. This baseline demographic information would then be represented in the agent environment by distributing the characteristics across each agent.

The dominant cultural dimensions in play could then be represented using Hofstede's dimensions. A country can be characterized by a score on each of the five cultural dimensions, which represent the country's standing on the dimension relative to other countries. Specific goals were then linked with cultural dimensions, by rating the extent to which specific cultural dimensions would be likely to impact on the fulfilment of specific goals. For example, being in a high Power Distance Index (PDI) culture would be very influential on the goals related to food, because of the large discrepancy between rich and poor people. Similarly, goals aimed at "achieving power" are likely to be more prominent in a high power distance culture than in a highly collective culture. Ratings of cultural strength and goal value were then combined to arrive at a "cultural impact" score. To arrive at the probability of specific goals being pursued, this cultural impact score was then multiplied by individual need levels. As such, people with high needs would be more likely to pursue goals that were also implicated by the primary cultural dimension in play.

Moreover, it was important to show that the influence of an external event would vary depending on the factors already in play. This was accomplished by rating external events in terms of their probable impact on the achievement goals of individuals. Different external events would naturally be expected to impact in some human domains more than in others. An economic downturn, for example, would influence goals that involved financial resources (e.g. food and seeking status) more than it would influence relationship goals. Using the same methodology, then, the impact of external events on goal-directed behaviour could be calculated via corresponding changes in individual status.

The report ends with recommendations for the next level of research working to improve the fidelity of the simulation. These include the need for more elaboration of the existing approach and incorporation of personality dimensions. In addition, the potentially important role of mood and emotion is discussed, as well as other ways to improve the fidelity of the proposed cultural modelling approach.

Sommaire

Adams, B.D., Sartori, J.A., Waldherr, S. 2006. Cultural Modelling: Literature Review. CR 2006-190, Defence Research and Development Canada - Toronto.

Les recherches réalisées jusqu'ici sur le comportement des foules à l'aide de modèles informatiques du comportement humain ont une portée limitée dans la mesure où elles ne s'intéressent qu'aux comportements prototypiques sans tenir compte des influences culturelles. Le présent projet entreprend de représenter la culture dans un contexte de simulation en relevant les principales caractéristiques qui sont communes à toutes les cultures, tout en les différenciant.

Divers facteurs ont une incidence sur les objectifs que visent les individus, notamment la situation personnelle, la famille, la politique et la culture nationale. L'accent est mis ici sur la culture, le rôle de la culture ayant nettement été relégué à l'arrière-plan dans les modèles informatiques. Diverses définitions de la culture ont été proposées dans la littérature. Selon Hofstede (1991; cité dans Dahl, 2005), la culture englobe les valeurs, les rituels, les héros et les symboles. Les modes de comportement se manifestent dans toutes les couches d'une culture. Hofstede (1980, 1994; cité dans Hofstede et Hofstede, 2005) a mis au point un modèle fondé sur les caractéristiques culturelles, qui peut servir à différencier les cultures. Selon ce modèle, la culture repose sur cinq dimensions : la distance hiérarchique, le contrôle de l'incertitude, l'individualisme, la masculinité et l'orientation temporelle. Les travaux d'Hofstede sont réputés avoir apporté une contribution énorme au domaine des sciences sociales (p. ex., Bond, 2002), mais certains (p. ex., McSweeney, 2002) ont aussi mis en évidence plusieurs de leurs lacunes théoriques et méthodologiques. D'autres recherches ont toutefois fait ressortir des arguments solides à l'appui des travaux de Hofstede et de leur capacité de prédiction du comportement humain (p. ex., Volkema, 2004).

Il est difficile d'établir comment mieux représenter la diversité culturelle dans un contexte de simulation, mais la littérature propose diverses façons de procéder pour établir des modèles de comportements complexes orientés vers un but qui ont été utilisés dans les recherches et travaux antérieurs (p. ex., Poznanski et Thagard, 2005), ainsi que plusieurs critères liés à la fidélité psychologique. Ainsi, pour bien modéliser les comportements humains, il faudrait insister sur la cohérence intra-individuelle, sur la cohérence inter-individuelle, ainsi que sur les effets contextuels (Bedner et Page, 2005). Notre examen de la littérature traitant de la culture et de la simulation, et nos discussions avec les experts scientifiques, nous ont aidés à définir les exigences précises de la démarche à suivre pour la modélisation de la culture dans le cadre du présent projet. Premièrement, il faudrait que les individus observés dans l'environnement modélisé adoptent un comportement qui soit le plus conforme possible à leur milieu culturel. Deuxièmement, il faudrait que les sujets dans le même contexte visent des objectifs et manifestent des comportements différents qui devraient, idéalement, évoluer au fil du temps. Troisièmement, il faudrait concevoir une méthodologie qui permettrait aux sujets de réagir à des circonstances extérieures.

La démarche proposée impliquait plusieurs étapes. D'abord, on a défini la situation/les besoins individuels en fonction d'un ensemble d'objectifs prototypiques. Ces objectifs ont été

inspirés des travaux de Schank qui en a distingué quatre types : les objectifs liés à la satisfaction, les objectifs liés au plaisir, les objectifs liés à la réalisation et les objectifs liés à la préservation (Eiselt et Holbrook, 1998). Il va sans dire que les objectifs diffèrent selon que l'individu a des besoins importants ou restreints. Pour les besoins d'une modélisation de la culture, toutefois, il faudrait pouvoir représenter des individus divers qui visent chacun des objectifs quelque peu différents. Dans cette optique, une façon de procéder consisterait à dresser le profil démographique du pays cible afin de vérifier la situation « de base » de sa population et de comprendre d'autres indicateurs culturels pertinents, comme les coutumes. On représenterait ensuite ces données démographiques de référence dans l'environnement modélisé en les appliquant à chaque sujet.

On pourrait ensuite représenter les dimensions culturelles dominantes en jeu à la lumière des dimensions définies par Hofstede. Un pays peut être caractérisé par un score applicable à chacune des cinq dimensions culturelles, qui rendrait compte de sa situation à l'égard de la dimension, par rapport à celle d'autres pays. On pourrait ensuite établir un lien entre des objectifs précis et les dimensions culturelles en évaluant l'impact que pourraient avoir les dimensions culturelles précises sur la réalisation d'objectifs précis. Par exemple, l'appartenance à une culture où l'indice de distance hiérarchique est élevé aurait sans doute une incidence très marquée sur les objectifs liés à l'alimentation, en raison de l'importance des disparités entre les riches et les pauvres. De même, les objectifs liés à « la quête du pouvoir » occupent sans doute une place plus importante dans une culture où la distance hiérarchique est grande que dans une culture où prime le collectivisme. On a ensuite additionné les valeurs relatives à la force culturelle et les valeurs relatives aux objectifs pour obtenir un score relatif à l'impact culturel. Afin de calculer la probabilité liée à la poursuite d'un objectif précis, on a ensuite multiplié ce score (relatif à l'impact culturel) par le niveau des besoins individuels. Ainsi, il est plus probable qu'un individu ayant des besoins importants cherche à atteindre des objectifs correspondant également à la principale dimension culturelle en jeu.

De plus, il était important de montrer que l'influence exercée par un événement extérieur varierait selon les facteurs déjà en jeu. Pour ce faire, on a évalué les événements extérieurs selon leur impact probable sur la réalisation des objectifs individuels. On pouvait naturellement s'attendre à ce que différents événements extérieurs aient plus de répercussions sur certaines dimensions de la vie humaine que sur d'autres. Un ralentissement économique, par exemple, aurait une incidence plus marquée sur des objectifs liés aux ressources financières (p. ex. l'alimentation et la recherche d'une condition meilleure) que sur des objectifs liés aux relations personnelles. En utilisant la même méthodologie, on pourrait ensuite calculer l'impact des événements extérieurs sur les comportements orientés vers un objectif à la lumière des changements correspondants touchant la situation individuelle.

Le rapport offre pour conclure des recommandations concernant les prochains travaux de recherche à entreprendre pour améliorer la fidélité de la simulation. Il faudrait par exemple perfectionner l'approche existante et intégrer les dimensions relatives à la personnalité. Il s'intéresse également à l'importance du rôle que peuvent revêtir l'humeur et les émotions, et à d'autres moyens d'améliorer la fidélité de l'approche proposée au chapitre de la modélisation de la culture.

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1. Introduction to Cultural Modelling

1.1 Background

Past research on crowd behaviour has been used to develop computer models of human behaviour in mob settings. These models, however, have been limited in that they only model prototypical behaviour. Although this is acceptable for small training scenarios, it is inadequate when wishing to model a society with different cultures. As such, this work aims at defining and conceptualizing psychological and broader social factors that have the potential to influence levels of human fidelity within the first person gaming environment. The primary focus of this work will relate to cultural models, but broader social, familial, and political factors likely to influence goal directed behaviour will also be explored. As such, the level of analyses will constantly shift from the broader societal level to the level of goals.

This work is intended to assist software programmers to more accurately represent specific aspects of goal within gaming environments. As such, the focus will be on defining the relevant dimensions, and then exploring and articulating how these dimensions should be represented at the level of agent goals.

1.2 Purpose

The objective of this research project was to identify salient characteristics that are common to all cultures but can differentiate these cultures. These characteristics should be modelled in a manner that provides a group of software agents with emergent culturally influenced goals. This work aims at defining and conceptualizing psychological and broader social factors that have the potential to influence levels of human fidelity within the first person gaming environment.

This review will focus on two sources of information. The first is the relevant scientific literature that explores the cultural/social/personality factors likely to influence goal directed behaviour. The second potential source will be articles about human realism in gaming in order to determine whether (and if so, how), these factors have been represented by other programmers. The contractor will provide a brief synopsis of the main points made in the reference material and provide links to other relevant, similar works. There is no limitation on the age of the material or the source of the material.

This report was accomplished in two phases: initial review and report phase and a focused report stage. An interim report was prepared summarizing the initial literature review phase. In response to this report (and related meeting), the scientific authority then provided additional focus to the project. Specifically, although our focus had been toward defining culturally influenced behaviours, it was more helpful to the needs of the scientific authority to focus on culturally influenced goals. This was important because goals allow more parsimonious programming of computer agents.

To the extent possible, then, we have attempted to reframe the final report in terms of culturally influenced goals rather than specific behaviours. In order to provide the highest possible level of advice to the SA for future efforts, however, we have appended the discrete behaviour charts in Annex A of this report. In addition, in the final phases of work, we have also attempted to include emotions into the proposed methodology.

1.3 Structure of the Report

This report will discuss cultural modelling in three broad sections. The initial section discusses the various determinants of goal directed behaviour, from the broader cultural elements to the more specific individual factors. The second section defines culture and the various theories related to understanding and distinguishing cultures. Prominent in this section are explanations of Hofstede's five culture dimensions and a critique of his research. The third and final section of the report will outline the implementation strategies for heightening the levels of human fidelity within a gaming environment.

2. Determinants of Goal-Directed Behaviour

A major purpose of this project is to provide guidance about how to model human behaviour in more complex ways. Human behaviour is often seen to be motivated by both physiological and psychological needs. Just as one must have the basics of life in order to survive, higher level needs (e.g. arts, self-actualization) are also seen as important. In order to satisfy these needs, people often adopt many different goals that help to focus their efforts on both specific and more general needs. A goal can be defined simply as an impetus to behave in a certain way. Human goals are therefore the driving force behind our behaviours. For instance, having a personal goal of acquiring many different possessions would likely be associated with several different behaviours that are directed at satisfying this need.

More broadly, however, goals are often seen to be hierarchical, in the sense that one goal needs to be satisfied before other goals come into play. These goals are accomplished by engaging in behaviours or action plans.

Goals, and ultimately our behaviours are shaped by a variety of factors. These factors can range from more specific individual variables, such as individual status, to broader societal variables, such as national culture. The following section will discuss the various determinants of goal directed behaviour in an effort to understand the structure and content of individual goal hierarchies.

2.1 Maslow's Hierarchy of Needs

In order to understand the motivation behind human behaviour, Abraham Maslow developed a theory of human needs. Maslow's hierarchy of needs is a motivational theory that argues that lower basic needs must be met in order to satisfy higher growth type needs ("Abraham Maslow", 2006). The hierarchy consists of five successive levels, which is often depicted as a pyramid (see Figure 1).

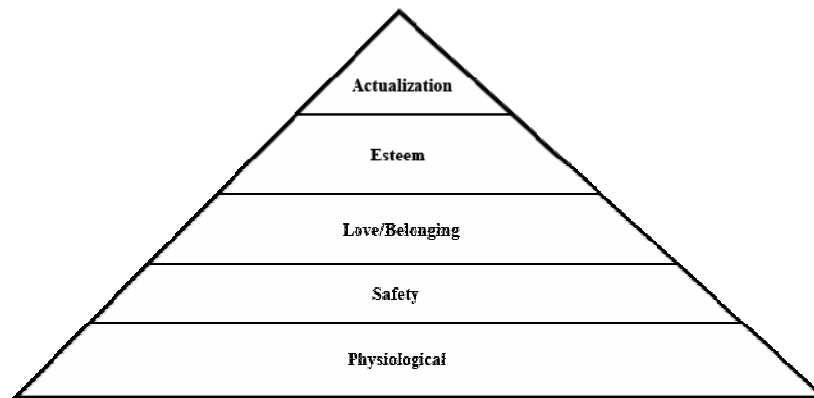


Figure 1. Maslow's hierarchy of needs ("Abraham Maslow", 2006)

The four lower levels of the pyramid represent deficiency needs, while the top level represents growth needs. The physiological needs are the most basic of our needs and therefore take precedence over all other needs ("Abraham Maslow", 2006). The need for food, water and shelter are the types of requirements that would fall under this category. Physiological needs influence our thoughts and behaviour and the inability to meet such needs can lead to sickness, pain and discomfort ("Abraham Maslow", 2006). Following physiological needs is the need for safety and security. There are a number of needs associated with safety and security, such as the need to secure employment, physical security (violence, delinquency), and security of revenues. Some societies provide the means for individuals to meet these needs (e.g. old age security pension), while others leave it to the individual to provide for themselves. After the physiological and safety needs are met, the next level represents social needs. These needs involve relationships and the feelings associated with belonging to a group ("Abraham Maslow", 2006). Such things as the need to marry, to have friends and to belong to a religious group would be associated with our social needs and deprivation of such needs can lead to loneliness, anxiety and depression (Boeree, 2006). The final of the four deficiency needs is the need for esteem, which can be divided into lower and higher order esteem needs. Those in the lower order relate to one's need for respect, status, power, dignity, fame, attention and recognition ("Abraham Maslow", 2006). The higher order esteem need relates to such things as the need for competence, self-respect, achievement, and freedom. Lack of these needs can cause low self-esteem and inferiority complex (Boeree, 2006).

The deficiency needs are labelled as such because they are only recognized when they are not present (deficient) ("Abraham Maslow", 2006). When the needs are fulfilled, there is no longer motivation in the relevant area. Satisfying all deficiency needs allows movement toward higher levels needs, with the ultimate goal being the need to use our unique abilities to self-actualize and to grow ("Abraham Maslow", 2006). According to Maslow, people who have self-actualized embrace the facts and realities of the world are creative, solve problems and do not surrender to difficulties, appreciating life, foster deep personal relationships and judge others without

prejudice (“Abraham Maslow, 2006). Unlike the deficiency needs, once the needs associated with self-actualization are engaged, they are continued to be felt and are continuously fulfilled (Boeree, 2006).

In order to satisfy the needs outlined by Maslow, individuals must set goals specific to each of the needs. For instance, the need for food would require an individual to set goals related to seeking and acquiring food, whereas the need for love would require one to seek out relationships. Once the goals are established, the individual will engage in certain behaviours or actions in order to satisfy such goals and ultimately the needs.

2.2 Individual Status

An individual’s status will also influence goal-directed behaviour. There are many different indicators of an individual’s status within a given society. These include health, wealth, level of education etc.

Socioeconomic status (SES) is an important individual status variable that is associated with goal directed behaviour. SES comprises a number of variables including occupation, education, wealth, and place of residence. Individuals who are part of a lower socioeconomic status tend to work in lower status jobs, be less educated, impoverished and reside in deprived neighbourhoods. Conversely, those of high socioeconomic status occupy high status work positions, are financially well off, highly educated and reside in wealthy neighbourhoods consisting of large homes. Goals are likely to differ based on one’s socioeconomic status, such that those in a lower status would be more likely to establish survival goals and goals of acquiring a good job. Conversely, those in high status positions would be more likely to seek material possessions and have travel goal. These goals will ultimately lead to different types of behaviours. For instance, studies investigating the effects of socioeconomic status on behaviour have found it to be related to a variety of individual behaviours including smoking behaviours (e.g., Laaksonen, Rahkonen, Karvonen & Lahelma, 2005), sexual behaviours (e.g., Booyesen & Summerton, 2002) and food behaviours (e.g., Inglis & Ball, 2005), to name a few.

Health can also have a dramatic effect on one’s goal-directed behaviour. People with health concerns may establish goals for improving their health and their overall well-being. For example, unhealthy individuals may seek doctors whereas those with good health may have exercise goals. Further, the extent to which an individual’s health affects their goal and subsequent behaviour depends on the severity of their health concerns. Chronic or life-threatening illnesses (e.g., cancer, AIDS, etc.) are more likely to initiate more drastic changes in goals than are less serious illnesses.

2.3 Personality

One of the most prominent influences on human behaviour is personality. Individual personality is typically distinguished as both learned and inherited, and is modified by both personal experiences and by cultural factors. Personality has generally been defined using the Five Factor Model (FFM), otherwise known as the Big Five

personality dimensions (Jordan, 2001). The FFM, developed by McCrae and Costa (1996), consists of the following five personality dimensions: (a) extraversion - being sociable, gregarious, assertive, talkative, and active (b) emotional stability – being secure, stable, relaxed, self-sufficient and tolerant of stress (c) agreeableness – being courteous, flexible, cooperative, and tolerant (d) conscientiousness – being careful, thorough, organized, achievement oriented and hardworking and (e) openness to experience – being imaginative, cultured, intelligent and broadminded (Jordan, 2001). The five factor model has been used in various research efforts in the prediction of behaviour and has often been found to account for a significant amount of variability in behaviour. For instance, a study conducted on team behaviour found that military teams' average conscientiousness and agreeableness correlated with supervisor-rated and team-level performance (Halfill, Sundstrom, Nielsen, and Weilbaecher, 2005).

2.4 Family

The transmission of values, attitudes, and belief systems often occurs at the familial level, whether through the immediate or extended family. From a young age, children are taught to value different things whether through explicit teachings or observations of behaviour. Further, their attitudes and beliefs are also formed early on and carried throughout their life. Because these values, attitudes and beliefs are often learned early on, they are deeply rooted in individuals and therefore do not readily change. As such the same values, attitudes, and beliefs are passed down from one generation to another. The values, attitudes, and belief systems inherent in a family generate goals and therefore behaviours that are often shared between members of that family. Typical family-influenced goals at this level would include achieving a higher education, which would lead an individual to do well in school. Because these behaviours represent the values, attitudes and beliefs of the family, they are highly esteemed and therefore enforced through either positive reinforcement or punishment if they are opposed. Given that the family is the closest social network one may experience, goals and behaviours learned through this medium are often quite salient.

2.5 Religion

Religion refers to “a group of beliefs concerning the supernatural, the sacred or the divine and the moral codes, practices, values, institutions and rituals associated with such beliefs” (“Religion”, 2006, para.1). Religion can form a large part of an individual's life, often governing many of their goals and behaviours. Such goal directed behaviours are based on the values and beliefs inherent in their religion and people are often encouraged to exhibit these goal-directed behaviours if they are to stay true to their religion. Of course, just as goals make some activities more likely, they also make others less likely. For instance, in Catholicism, individuals are prohibited from engaging in premarital sex or using birth control. These behaviours are based on the value that the religion places on the sanctity of marriage and the goal of staying congruent with the expectations of one's religion. As such, anything that opposes this value is frowned upon.

2.6 Social Norms

As previously discussed social norms consist of expectations relating to individual and/or group behaviour in different situations. They are typically implicit rather than explicit rules, and are not openly taught. These social norms are often perpetuated through the life of a society, and their continuance is dependent on the proper socialization of individuals who accept these norms. In other words, individuals are educated to follow certain norms at a young age, often without any rational explanation. This process sometimes continues even after the norm no longer has any meaningful purpose. Further, social pressures also force people to conform to what is the “norm”. By going against this pressure, individuals take the risk of being deemed an outcast or deviant. Norms also tend to be socially enforced with the use of sanctions, which may vary depending on the importance of the norm (“Culture”, 2006). Given that norms are so engrained in our society and strong pressures may exist to follow the norms, it is understandable that individuals will often strive to conform to such norms by engaging in goal consistent behaviours.

2.7 Economics

Broadly, economics refers to the production, distribution, trade and consumption of goods and services (“Economics”, 2006). Economic issues can have serious implications for human goals and behaviours. In the most general sense, economic issues can greatly influence the quality of human life within a given culture. Countries that are economically deprived (e.g., Congo) cannot provide their citizens with adequate care in terms of food, shelter, and education. As such, individuals will strive to acquire such needs on their own and therefore certain goal-directed behaviours such as begging, stealing and violence would be more likely to occur given such a situation.

2.8 Politics

Politics is a process by which collective decisions are made within groups at varying levels of human interaction, including government, corporate, academic, and religious institutions (“Politics”, 2006). Different political systems convey different values that manifest themselves in different types of goals directed behaviours. For instance, in Canada, politically conservative systems value the traditional family and militarism. Therefore, such political systems have historically been less likely to support same sex marriage and to be more likely to promote war.

2.9 Laws

Laws refer to “rules or norms of conduct which mandate, proscribe or permit specified relationships among people and organizations, intended to provide methods for ensuring the impartial treatment of such people, and provide punishments of/for those who do not follow the established rules of conduct” (“Law”, 2006, para. 1). Laws, similar to social norms, have varying degrees of enforcement, such that

punishments vary with the type of law and associated behaviour. As such, individuals seek to follow such laws depending on the severity of the law. That is, individuals will be less likely to engage in those behaviours with strict laws due to the fear of reprisal. Conversely, individuals are more likely to engage in those behaviours where the laws are more lenient and punishment is less severe. Because laws differ depending on the, country, city, or even town, goal-directed behaviours will also vary depending on where the individual resides and therefore the type of laws that are established.

2.10 National Culture

As was discussed in previous sections, national culture is a complex phenomenon that has been defined in a number of ways. Broadly it refers to values, norms and artifacts inherent in a society. Values are at the core of a culture and therefore represent the driving force behind the goals that people pursue, and the behaviours in which people engage. Culture pervades every aspect of individual's life and although implicit, it is constantly present. It influences our place in society, how we manage relationships and family; the manner in which we engage in our professional work; the type of education we receive and what kind of government we rule under. Culture is all-encompassing and therefore influences many other determinants of goal-directed behaviour. For instance, family values, attitudes and beliefs largely stem from one's culture. Individual status (e.g., whether there are large or small differences in socioeconomic status) is influenced by culture.

2.11 Summary

Human goals are the driving force in our behaviour. These goals are accomplished by engaging in behaviours or action plans. For instance, to the extent that an individual is hungry, they will establish goals and act in order to fulfil this need, such as seeking food. According to Maslow, there are five basic human needs ranging from the basic physiological to the more abstract self-actualizing needs. As discussed in previous sections, human beings typically have many different goals that they use to meet their needs. The very determination of these goals is influenced by many factors, including individual status, personality, family, religion, social norms, economics, politics, laws, as well as national culture.

Of the many forms of individual status, the most prominent influence is socioeconomic status (SES), consisting of one's occupation, education, wealth, and place of residence. Personality has generally been defined using the Five Factor Model (FFM), which has often been found to account for some variability in goal-directed behaviour. An individual's health can also have a dramatic effect on goals and behaviour and the extent to which health has an affect depends on the severity of the health concerns. Aside from individual status, the family unit can also influence an individual's goals and behaviours through the values, attitudes, and belief systems that are shared among the family members. These goals and behaviours are highly esteemed and therefore enforced either through positive reinforcement or punishment

if they are opposed. Religion, another potentially significant tenant in an individual's life can also have a large impact on goal-directed behaviour through the values and beliefs it imposes. Individuals often adhere to such values, customs, and beliefs for fear of retribution if they do not. Similar to religion, social norms are enforced by society through the use of sanctions, which vary depending on the importance of the norm. Individuals are educated to follow certain norms at a young age, often without any rational explanation. By going against this pressure, individuals take the risk of being deemed an outcast or deviant.

Examining the determinants of goal directed behaviour at a national level shows that the economics of a country greatly influence the quality of human life within a given culture. Countries that are economically deprived (e.g., Congo) cannot provide for their citizens. Citizens must strive to satisfy such needs and therefore behaviours such as begging, stealing and violence would occur. In addition, the political system inherent in a society is based on certain values and beliefs. These values and beliefs determine what types of goal-directed behaviours a society will encourage or discourage and ultimately can affect how citizens will act. Laws, similar to social norms, have varying degrees of enforcement, such that punishments vary with the type of law and associated behaviour. As such, individuals will be less likely to engage in those behaviours with strict laws due to the fear of reprisal.

National culture subsumes many of the aforementioned factors and as such is one of the most influential determinants of goal-directed behaviour. For instance, it determines our place in society, how we manage relationships and family; the manner in which we engage in our professional work; the type of education we receive and what kind of government we rule under.



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3. The Concept of Culture

3.1 Introduction and Definition

The word “culture” is often used casually in day-to-day conversation to refer to a number of different concepts such as ‘organizational culture’ or ‘arts and culture’ (Dahl, 2005). Although these concepts are distinct in a number of ways, they are also common such that they reflect shared artifacts, behaviour patterns, and values which taken together form a unique culture (Dahl, 2005).

A number of alternative definitions of culture have been suggested in the literature. These various definitions often reflect the different theories for understanding or evaluating human activity. The Oxford Dictionary of Current English (2001) refers to culture as:

“The arts, customs and institutions of a nation, people or group.”

Whereas prominent culture researchers suggest that

“Culture is always a collective phenomenon, because it is at least partly shared with people who live or lived within the same social environment, which is where it was learned. Culture consists of the unwritten rules of the social game. It is the collective programming of the mind that distinguishes the members of one group or category of people from others.” (Hofstede & Hofstede, 2005, p. 4).

Culture has been viewed in a number of different ways with varying degrees of complexity. Earlier conceptions of culture have proposed that it consists of two layers, a layer of values, which is invisible, and a layer of behaviours and/or artifacts, which is visible (Dahl, 2005). For instance, in a competitive culture, “competitiveness” is a shared value among the people who belong to that culture. This implies that the members of a culture will behave competitively when dealing with other individuals. This concept of culture has been labelled an ‘iceberg model’, as only a small part of it is observable, and many aspects of culture are not apparent to the naked eye. Hofstede (1991; cited in Dahl, 2005), however, proposed a four layer model of culture whereby each layer is dependent on the lower layers. As such, culture is viewed as an onion since it can be peeled away layer by layer in order to reveal its contents (Dahl, 2005). As can be seen in Figure 2, culture consists of values, rituals, heroes, symbols and practices.

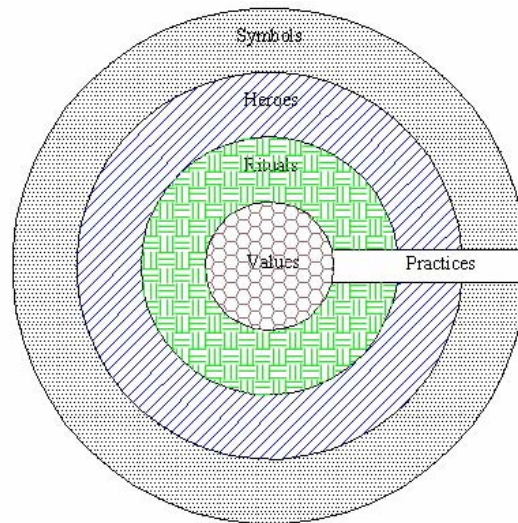


Figure 2. Manifestations of Culture at Different Levels of Depth (Hofstede, 1991; cited in Dahl, 2005)

At the centre of Hofstede’s model are values or “broad tendencies to prefer certain states of affairs over others” (Hofstede, 1994, p.8; cited in Dahl, 2005). Values are at the core of the onion as they are not easily observable. Values consist of ideas about what is important in life and they guide the rest of the elements of a culture (“Culture”, 2006). As such, they are the driving force behind peoples’ behaviours. Examples of values include loyalty, honour, wealth, and freedom. Above the values layer are three additional layers that are more discernable. Rituals, otherwise known as norms comprise of expectations relating to individual and/or group behaviour in different situations (“Culture”, 2006). Rituals, which can include different ways of greeting and paying respect, are more observable representations of a culture. For instance, in the U.S., saying grace before eating Thanksgiving dinner or exchanging gifts during the Christmas Holiday are examples of norms. Norms tend to be socially enforced with the use of sanctions of varying degrees, depending on the importance of the norm. Heroes (i.e., admired persons who serve as examples for behaviour) and symbols (i.e., words or artifacts that carry meaning) also reflect a culture but are not as hidden as the culture’s values. Artifacts are the material things that are made or modified by a human culture (“Culture”, 2006). Examples of artifacts include pottery, guns, and personal items such as jewelry (“Culture”. 2006). Finally, practices, which extend across all the layers of a culture, are visible behaviours that represent the more subtle and hidden cultural elements. Hofstede’s model, therefore, represents an extension of the previous two-level model such that the “behavioural” layer has been refined to include rituals, symbols, and heroes.

Culture can be represented at many different levels, such that people within the same culture may share several different levels (“Culture”, 2003).

Some of the most prominent levels of culture include:

- National – nation as a whole
- Regional – ethnic, linguistic or religious differences within a nation
- Gender
- Generation
- Social Class
- Corporate Level

In fact, there has been much debate as to the level at which culture should be studied. Because there are no rules establishing how many people make up any one culture, finding the appropriate level of analysis has sometimes been difficult (Dahl, 2005). For instance the term ‘Latin culture’ links diverse countries such as Italy, Spain, and Brazil under a common culture. This suggests that culture can include a large number of people and can cross political and national boundaries. Conversely, an ‘Afro-American or Bavarian culture’ is much smaller, such that it includes a limited number of people and has much more distinct characteristics. As such, these types of cultures are often referred to as subcultures. Although culture can be studied at a number of levels, for practical reasons, national culture has been the preferred level of analysis (with the exception of specific research questions directed towards other forms of culture, e.g., organizational culture) (Dahl, 2005). This is the case because national culture can be more easily established than can subcultures, as people may be members of more than one subculture (Dahl, 2005). Further, there is support that individuals from the same country tend to share the same values and norms which is at the core of a culture.

Culture is a complex concept, thus differentiating one culture from another is a difficult process. In order to distinguish among the various cultures, researchers have attempted to characterize the various patterns of culture. The most famous work was accomplished by the Dutch organizational anthropologist Hofstede who derived five cultural dimensions. A description of the five dimensions and key characteristics associated with the given cultural dimension is outlined in the subsequent section.

3.2 Cultural Dimensions

Hofstede (1980, 1994; cited in Hofstede & Hofstede, 2005) developed a model of culture based on his work as a manager at IBM. During this work, he discovered data from employee surveys taken between 1967 and 1973 that he believed said something about the values and attitudes of employees based on their country of origin (McSweeney, 2002). In all, data on 117, 000 employees from 66 countries were examined. As a result of a series of factor analyses and other philosophical and statistical analyses, he argued that there were four primary cultural dimensions on which intercultural differences in values, attitudes, and behaviour could be explained. These were power distance, individualism, masculinity, and uncertainty avoidance. At a later date (2005), he added a fifth cultural dimension, long-term orientation. With

these dimensions, he argues, any culture can be modelled. That is, he believed that he could place cultures/countries somewhere along each of these continua, and as such, represent intercultural differences and similarities. Each of the five dimensions is defined below and described in detail in the following sections.

Table 1: Hofstede's Dimensions of Culture ("Geert Hofstede Cultural Dimensions", 2006)

Power Distance Index (PDI) focuses on the degree of equality, or inequality, between people in the country's society. A High Power Distance ranking indicates that inequalities of power and wealth have been allowed to grow within the society. These societies are more likely to follow a caste system that does not allow significant upward mobility of its citizens. A Low Power Distance ranking indicates the society de-emphasizes the differences between citizen's power and wealth. In these societies equality and opportunity for everyone is stressed.
Uncertainty Avoidance Index (UAI) focuses on the level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations. A High Uncertainty Avoidance ranking indicates the country has a low tolerance for uncertainty and ambiguity. This creates a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty. A Low Uncertainty Avoidance ranking indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions. This is reflected in a society that is less rule-oriented, more readily accepts change, and takes more and greater risks.
Individualism (IDV) focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. A High Individualism ranking indicates that individuality and individual rights are paramount within the society. Individuals in these societies may tend to form a larger number of looser relationships. A Low Individualism ranking typifies societies of a more collectivist nature with close ties between individuals. These cultures reinforce extended families and collectives where everyone takes responsibility for fellow members of their group.
Masculinity (MAS) focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control, and power. A High Masculinity ranking indicates the country experiences a high degree of gender differentiation. In these cultures, males dominate a significant portion of the society and power structure, with females being controlled by male domination. A Low Masculinity ranking indicates the country has a low level of differentiation and discrimination between genders. In these cultures, females are treated equally to males in all aspects of the society.
Long-Term Orientation (LTO) focuses on the degree the society embraces, or does not embrace, long-term devotion to traditional, forward thinking values. High Long-Term Orientation ranking indicates the country prescribes to the values of long-term commitments and respect for tradition. This is thought to support a strong work ethic where long-term rewards are expected as a result of today's hard work. However, business may take longer to develop in this society, particularly for an "outsider". A Low Long-Term Orientation ranking indicates the country does not reinforce the concept of long-term, traditional orientation. In this culture, change can occur more rapidly as long-term traditions and commitments do not become impediments to change.

3.2.1 Power Distance

As described earlier, power distance (as indicated by the Power Distance Index or PDI) is one of the primary dimensions of a culture (Hofstede & Hofstede, 2005). The power distance dimension reflects the level of tolerance for inequality within a given culture. In general, large distances in power indicate that inequalities of power and wealth are relatively tolerated within that culture; whereas small power distances indicate that the culture in question does not seek to divide society into rich and poor. Applications of these definitions suggest that a culture in which large power distances are allowed to exist would not only place great emphasis on wealth and power, but would seek to control and maintain this power 'in the hands of the few'. Conversely, a culture in which power distances are relatively small would likely not place great value on power and wealth and would thus be more likely to maintain a collectively ruled culture.

Hofstede and Hofstede (2005) suggest that there are several levels of culture within a single culture. The primary level of course is the state or government level, which has broad-reaching effects on other subcultures. The state level is important to consider because it represents the over-arching power distance principle in the society; thus, in theory it represents the macro-level out of which all other levels realize their PDI. In addition, the other levels reinforce and are influenced by the state levels. These subcultures are represented by various institutions including family and school, and the workplace. Each of these levels of culture is considered.

Hofstede and Hofstede's (2005) theoretical analysis of the types of behaviours representative of various factors that describe large and small power distance indices within the state, as shown in Table 2.

Table 2: Key Differences between Small and Large Power Distance Societies: The State (Hofstede & Hofstede, 2005, p. 67)

SMALL POWER DISTANCE	LARGE POWER DISTANCE
The use of power should be legitimate and follow criteria of good and evil	Might prevails over right: whoever holds the power is right and good
Skills, wealth, power and status need not go together	Skills, wealth, power, and status should go together
Mostly wealthier countries with a large middle class	Mostly poorer countries with a small middle class
All should have equal rights	The powerful should have privileges
Power is based on formal position, expertise and ability to give rewards	Power is based on tradition or family, charisma, and the ability to use force
The way to change a political system is by changing the rules (evolution)	The way to change a political system is by changing the people at the top (revolution)
There is more dialogue and less violence in domestic politics	There is less dialogue and more violence in domestic politics
Pluralist governments based on outcome of majority votes	Autocratic or oligarchic governments based on cooperation
The political spectrum shows a strong centre and weak right and left wings	The political spectrum, if allowed to exist, has a weak centre and strong right and left wings
There are small income differentials in society, further reduced by the tax system	There are large income differentials in society, further increased by the tax system
There is less perceived corruption; scandals and political careers	There is more perceived corruption; scandals are usually covered up

At the state level, high PDI cultures value wealth and status, politics, and class. On the other hand, countries with lower PDIs believe that power is represented by what is morally right, and are more likely to uphold equal rights for all. However, when problems are identified in high PDI cultures, the attitude of the masses is that those who hold the power are directly to blame (Hofstede & Hofstede, 2005). Powerful parties or individuals in high PDI societies enjoy great privileges, but are also held wholly accountable for social instability or breakdowns. As such, they can be extremely vulnerable to revolt as the larger lesser privileged segment of the population tends to resort to violence possibly because of their lack of other non-violent resources to initiate change. As such, countries with lower PDIs tend to be more stable politically, economically, and socially, and they use an electoral system. These countries tend to be wealthier than countries with higher PDIs who are also relatively less stable and do not have an election process. Canada and the United

States can be said to have relatively small PDIs, whereas West Africa and Malaysia can be said to have relatively larger power distance indices.

In terms of general norms, family and education, Table 3 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in high and low PDI cultures.

Table 3: Key Differences between Small and Large Power Distance Societies: General Norm, Family, and School (Hofstede & Hofstede, 2005, p. 57)

SMALL POWER DISTANCE	LARGE POWER DISTANCE
Inequalities among people should be minimized	Inequalities among people are expected and desired
Social relationships should be handled with care	Status should be balanced with restraint
There should be, and there is to some extent, interdependence between less and more powerful people	Less powerful people should be dependant; they are polarized between dependence and counter dependence
Parents treat children as equals	Parents teach children obedience
Children treat parents and older relatives as equals	Respect for parents and older relatives is a basic and lifelong virtue
Children play no role in old-age security of parents	Children are a source of old-age security to parents
Students treat teachers as equals	Students give teachers respect, even outside of class
Teachers expect initiative from students in class	Teachers should take all initiative in class
Teachers are experts who transfer impersonal truths	Teachers are gurus who transfer personal wisdom
Quality of learning depends on two way communication and excellence of students	Quality of learning depends on excellence of teacher
Less educated persons hold more authoritarian values than more educated persons	Both more and less educated persons show equally authoritarian values
Educational policy focuses on secondary schools	Educational policy focuses on universities

With regard to general societal norms, a culture with a smaller PDI would uphold principles that encourage the independence and freedom of its citizens whereas a culture with a larger PDI would uphold the principle of inequality among people. A very similar pattern is seen in the schools; in schools that evidence larger power distances, children are expected to be dependent on and obey their teachers. They are required to sit-up and listen, only speak when called upon, and never contradict the teacher, and the teacher's word is taken as gospel truth. As such, students in low PDI schools are more likely to learn how to learn and to think more independently and creatively. It might then be expected that gaining an education in these types of schools is one of the keys to a good lifestyle and the ability to make informed choices in a country with small power distance relations. Conversely, larger power distance norms focus on and perpetuate inequalities through the designation of resources such

as money toward university versus money toward secondary schools (Hofstede & Hofstede, 2005).

In families with greater power distances, “children are expected to be obedient to their parents” and to their older siblings, no questions asked (Hofstede & Hofstede, 2005, p. 51). Moreover, children in families with larger power distances can be described as dependent, whereas children in smaller power distance families can be better characterized as independent persons. This independence may be especially recognizable when they become adults when their relationship with their parents may in fact become a friendship. It is important to note the interaction of household power distance with the class of the family in society; that is, middle and upper class parents tend to aspire to smaller power distance households and lower class parents tend to run a household governed by larger power distances. This pattern is mediated by the PDI of a particular country, however, with this trend especially true in smaller power distance countries.

Within the workplace, there are also many differences between high and low PDI cultures, as shown in Table 4.

Table 4: Key Differences between Small and Large Power Distance Societies: The Workplace (Hofstede & Hofstede, 2005, p. 59)

SMALL POWER DISTANCE	LARGE POWER DISTANCE
Hierarchy in organizations means an inequality of roles, established for convenience	Hierarchy in organizations reflects existential inequality between higher and lower levels
Decentralization is popular	Centralization is popular
There are fewer supervisory personnel	There are more supervisory personnel
There is a narrow salary range between the top and bottom of the organization	There is a wide salary range between the top and bottom of the organization
Managers rely on their own experience and on subordinates	Managers rely on superiors and on formal rules
Subordinates expect to be consulted	Subordinates expect to be told what to do
The ideal boss is a resourceful democrat	The ideal boss is a benevolent autocrat, or “good father”
Subordinate-superior relations are pragmatic	Subordinate-superior relations are emotional
Privileges and status symbols are frowned upon	Privileges and status symbols are normal and popular
Manual work has the same status as office work	White-collar jobs are valued more than blue collar jobs

In high PDI cultures, centralization of power is more likely than in low PDI cultures. This means that communication is probably more open in the latter, giving workers of all levels a voice, and that collaboration among the various levels or positions in the organization is common (Hofstede & Hofstede, 2005). Moreover, privileges are likely to be distributed more equally throughout a smaller power distance workplace, and more constrained to upper levels in a high PDI work environment, whereas they

are seen mostly in the upper levels of larger power distance workplaces. Most importantly, in high PDI cultures, upper level workers are valued more highly than lower class workers in a larger power distance workplace. There is, however, an interaction between power distance and individual class in the workplace. Specifically, upper class workers demonstrate smaller power distance indices and the lower class workers evidencing larger power distance indices.

3.2.2 Uncertainty Avoidance

The second of Hofstede and Hofstede's (2005) cultural dimensions is weak versus strong uncertainty avoidance dimension. Ambiguity creates anxiety. Behaviourally, this means that people have differing levels of tolerance for ambiguity or uncertainty, and that they will generally try to prevent or control feelings of uncertainty either through avoidance or degrees of planning. At the cultural level uncertainty avoidance is defined as "the extent to which the members of a culture feel threatened by ambiguous or unknown situations" (Hofstede & Hofstede, 2005, p. 167). Uncertainty avoidance thus involves avoidance of the unknown or not understood. Although uncertainty/ambiguity may be distinguishable from risk which refers to fear for personal safety (Hofstede & Hofstede, 2005), the current authors argue that as risk involves an uncertain outcome, it is an ambiguous context.

In terms of the state, Table 5 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in weak and strong uncertainty avoidance societies.

Table 5: Key Differences between Weak and Strong Uncertainty Avoidance Societies: The Citizen and the State (Hofstede & Hofstede, 2005, p.194)

WEAK UNCERTAINTY AVOIDANCE	STRONG UNCERTAINTY AVOIDANCE
Few and general laws or unwritten rules	Many and precise laws or unwritten rules
If laws cannot be respected, they should be changed	Laws are necessity, even if they cannot be respected
Fast result in case of appeal to justice	Slow result in case of appeal to justice
Citizens competent toward authorities	Citizens incompetent toward authorities
Citizen protest is acceptable	Citizen protest should be repressed
Civil servants do not have law degrees	Civil servants have law degrees
Civil servants positive toward political process	Civil servants negative toward political process
Citizens are interested in politics	Citizens are not interested in politics
Citizens trust politicians, civil servants, and the legal system	Citizens are negative toward politicians, civil servants, and the legal system
There is high participation in voluntary associations and movements	There is low participation in voluntary associations and movements
The burden of proof of identifying a citizen is on the authorities	Citizens should be able to identify themselves at all times
Liberalism	Conservatism, law and order
Positive attitudes toward young people	Negative attitudes toward young people
Tolerance, even of extreme ideas	Extremism and repression of extremism

With regard to the state, cultures that have stronger uncertainty avoidance mechanisms tend to have more restrictive laws, rules, and regulations as they often fulfil a need for security even if they are not followed. In strong uncertainty avoidance cultures citizens are very conservative and less likely to challenge authority figures. Further, they often carry negative sentiments (e.g., trust, faith, etc.) towards the political and legal system as well as towards the young.

Citizens from weak uncertainty avoidance cultures, on the other hand, believe they can participate in political decisions and are more likely than strong uncertainty avoidance countries to protest against government decisions, even if it means using unconventional protest actions. Citizens in this type of culture are also more likely to take part in voluntary associations for the betterment of society. Further, they tend to have more positive attitudes towards young people, people of different ethnic backgrounds, and extremist ideas.

In terms of general norms and family, Table 6 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in weak and strong uncertainty avoidance societies.

Table 6: Key Differences between Weak and Strong Uncertainty Avoidance Societies: General Norm and Family (Hofstede & Hofstede, 2005, p.176)

WEAK UNCERTAINTY AVOIDANCE	STRONG UNCERTAINTY AVOIDANCE
Uncertainty is a normal feature of life, and each day is accepted as it comes	The uncertainty inherent in life is a continuous threat that must be fought
Low stress and low anxiety	High stress and high anxiety
Aggression and emotions should not be shown	Aggression and emotions may at proper times and places be ventilated
In personality tests, higher scores on agreeableness	In personality tests, higher scores on neuroticism
Comfortable in ambiguous situations and with unfamiliar risks	Acceptance of familiar risks; fear of ambiguous situations and of unfamiliar risks
Lenient rules for children on what is dirty and taboo	Firm rules for children on what is dirty and taboo
Weak superegos developed	Strong superegos developed
Similar modes of address for different others	Different modes of address for different others
What is different is curious	What is different is dangerous
Family life is relaxed	Family life is stressful
In affluent Western countries, more children	In affluent Western countries, fewer children

With regard to the family, cultures that have strong uncertainty avoidance tendencies are more protective of their children and fearful for their safety. Children in such cultures learn from an early age the difference between clean and safe or dirty and dangerous, such that cleanliness is associated with safety and dirt is associated with danger. As such, objects, people and ideas that are considered "dirty" should be avoided at all costs and unfamiliar risks should not be taken. Their fear of uncertainty leads to anxiety, stress, and neuroticism. Further, people from cultures that have strong uncertainty avoidance tendencies tend to be less multi-cultural, and may in fact be rather xenophobic. This means that they may avoid or circumvent communications or cooperation with people from other cultures.

In contrast, citizens in weak uncertainty avoidance cultures are more liberal with their children, allowing them to run around, fall down and get back up again. Aggression and emotions tend not to be shown and feelings of anxiety and stress are less frequent. Citizens are more curious and likely to take risks. Overall, family life is far more relaxed. People also are more accepting of what is different, and therefore are more likely to give the benefit of the doubt to unknown situations, people and ideas.

In term of the workplace Table 7 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in weak and strong uncertainty avoidance societies.

Table 7: Key Differences between Weak and Strong Uncertainty Avoidance: The Workplace (Hofstede & Hofstede, 2005, p. 189)

WEAK UNCERTAINTY AVOIDANCE	STRONG UNCERTAINTY AVOIDANCE
More changes of employer, shorter service	Fewer changes of employer, longer service
There should be no more rules than strictly necessary	There is an emotional need for rules, even if these will not work
Hard-working only when needed	There is an emotional need to be busy and an inner urge to work hard
Time is a framework for orientation	Time is money
There is tolerance for ambiguity and chaos	There is a need for precision and formalization
Belief in generalists and common sense	Belief in experts and technical solutions
Top managers are concerned with strategy	Top managers are concerned with daily operations
More new trademarks	Fewer new trademarks
Focus on decision process	Focus on decision content
Entrepreneurs are relatively free from rules	Entrepreneurs are constrained by existing rules
There are fewer self-employed people	There are more self-employed people
Better at invention, worse at implementation	Worse at invention, better at implementation
Motivation by achievement and esteem or belonging	Motivation by security and esteem or belonging

In the workplace, strong uncertainty avoidance could mean that there is less inter-positional knowledge due to the high value placed on specialization in order to control for role ambiguity. In addition, there are likely to be more rules, less room for flexibility, less adaptability, and because of the lack of freedom, lower morale. The anxiety felt in strong uncertainty avoidance cultures leads to a need to work hard, to be busy and often hurried. Further, management, in strong uncertainty avoidance countries, tend to be more concerned with daily operations and therefore are more inclined to occupy themselves with such work. People from strong uncertainty avoidance cultures are also better at inventing new products; however, they perform less well during the implementation stage.

With regard to weak uncertainty avoidance cultures, due to their lower levels of anxiety, people are able to work hard when the need calls for it but also take the time to relax. As opposed to having a great deal of specialists, weak uncertainty avoidance cultures are more likely to rely on common sense and more generalists. Further, management is mostly involved in strategic decisions which are more ambiguous in nature and leaves operational work to lower level employees.

3.2.3 Individualism versus Collectivism

The third of Hofstede and Hofstede's (2005) cultural dimensions is the collectivism versus individualism dimension. Individualism refers to "societies in which... everyone is expected to look after himself or herself", whereas collectivism refers to "societies in which people from birth onward are integrated into strong, cohesive in-groups, which... protect them in exchange for loyalties" (Hofstede & Hofstede, 2005, p. 76). Most societies in the post-modern world are collectivist meaning that "the interest of the group prevails over the interest of the individual" (Hofstede & Hofstede, 2005, p. 74). In such societies, there is a greater trust and loyalty in the groups to which an individual belongs, such as one's family, school, and workplace, and the actions of the individual are usually intended to be in the best interests of the group rather than individual needs or wants. Indeed, the group's longevity relies on the cooperation and selflessness of individual constituents and the individual constituents' identity depends on the longevity of the group. This relationship is deep and often referred to as "practical and psychological" (Hofstede & Hofstede, 2005, p. 75).

The characteristics of people within collective groups tend to be more similar than variable. In contrast, individualistic societies and groups tend to produce and maintain members who are more variable than each other than in collectivistic groups, although it is acknowledged that as human beings, there will of course always be more similarity than difference. In this sense, the performance or longevity of a collective group or team rides on the similarities among its constituents, whereas the performance or longevity of an individualistic group or team depends on capitalizing on their differences.

Hofstede and Hofstede's (2005) theoretical analysis of the types of behaviours representative of various factors that describe collectivist and individualist indices within the state, as shown in Table 8.

Table 8: Key Differences between Collectivist and Individualist Societies: The State and Ideas (Hofstede & Hofstede, 2005, p.109)

COLLECTIVIST	INDIVIDUALIST
Opinions are predetermined by group membership	Everyone is expected to have a private opinion
Collective interests prevail over individual interests	Individual interests prevail over collective interests
The state holds a dominant role in the economic system	The role of the state in the economic system is restrained
Per capita GDP tends to be lower	Per capita GDP tends to be higher
Companies are owned by families or collectives	Joint stock companies are owned by individual investors
Private life is invaded by group(s)	Everyone has a right to privacy
Laws and rights differ by group	Laws and rights are supposed to be the same for all
Lower human rights rating	Higher human rights rating
Ideologies of equality prevail over ideologies of individual freedom	Ideologies of individual freedom prevail over ideologies of equality
Imported economic theories are unable to deal with collective and particularist interests	Native economic theories are based on pursuit of individual self-interests
Harmony and consensus in society are ultimate goals	Self-actualization by every individual is an ultimate goal
Patriotism is the ideal	Autonomy is the ideal
Outcome of psychological experiments depends on in-group-out-group distinction	Outcome of psychological experiments depends on ego-other distinction

There are a number of key differences between an individualist and collectivist society at the level of the state. It has been found that in individualistic societies, people form their own opinions and have individual interests apart from the group, whereas in collectivist societies people are more accustomed to group opinions and interests. In collectivist societies, the government plays a more dominant role in the economy as compared to individualistic cultures. In addition, collectivist cultures tend to be less wealthy, and companies are owned by families as opposed to individual investors. With regard to rights, individualist societies tend to uphold higher standards with regard to human rights and equality in front of the law. Many of the ideologies in a collectivist culture refer to consensus among groups whereas individualistic cultures strive for autonomy and individual freedom.

In terms of general normal, family and education, Table 9 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in collectivist and individualist societies.

Table 9: Key differences between collectivist and individualist societies: The General Norm and Family (Hofstede & Hofstede, 2005, p. 104)

COLLECTIVIST	INDIVIDUALIST
People are born into extended families or other in-groups that continue protecting them in exchange for loyalty	Everyone grows up to look after his or herself and his or her immediate (nuclear) family only
Children learn to think in terms of "we"	Children learn to think in terms of "I"
Harmony should always be maintained and direct confrontations avoided	Speaking one's mind is a characteristic of an honest person
Friendships are predetermined	Friendships are voluntary and should be fostered
Resources should be shared with relatives	Individual ownership of resources even for children
High-context communication prevails	Low-context communication prevails
Trespassing leads to shame and loss of face for self and group	Trespassing leads to guilt and loss of self-respect
Brides should be young, industrious, and chaste; bridegrooms should be older	Criteria for marriage and partner are not predetermined

With regard to general norms and family values, collectivist societies are more inclined to associate with their extended family, share their resources with the family and build friendships based on pre-determined familial ties. This type of behaviour reflects their group loyalty. People in individualistic cultures on the other hand are more focused on the "self", even from a young age, and are taught to look out for themselves. This represents a person's independence, a virtue upheld in individualistic cultures. Further, individuals tend to procure their own resources and friendships are made voluntarily. Harmony in a collectivist society is valued to the extent that confrontation is avoided at all costs. Children, who repeatedly voice their opinions deviate from what is collectively felt, are considered to have bad character. This contrasts the individualistic society where speaking one's mind is an attribute that is encouraged and is characteristic of an honest person. Other concepts that are important to collectivist cultures are shame and face which are felt when rules are infringed upon. Individualistic cultures, conversely, feel guilt when rules are infringed upon. Shame is social in nature and occurs only when others are aware of the infringement. Guilt on the other hand is individual in nature and is felt even if the infringement is unknown.

Within the workplace, there are also many differences between collectivist and individualist societies, as shown in Table 10.

**Table 10: Key Differences between Collectivist and Individualist Societies:
School and Workplace (Hofstede & Hofstede, 2005, p. 104)**

COLLECTIVIST	INDIVIDUALIST
Students only speak up in class when sanctioned by the group	Students are expected to individually speak up in class
The purpose of education is learning how to do	The purpose of education is learning how to learn
Diplomas provide entry into higher status groups	Diplomas increase economic worth and/or self respect
Occupational mobility is lower	Occupational mobility is higher
Employees are members of in-groups who will pursue their in-group's interest	Employees are "economic men" who will pursue the employers interest if it coincides with their self-interest
Hiring and promotion decisions take an employees in-group into account	Hiring and promotion decisions are supposed to be based on skills and rules only
The employer-employee relationship is basically moral like a family link	The employer-employee relationship is a contract between parties on a labour market
Management is management of groups	Management is management of individuals
Direct appraisal of subordinates spoils harmony	Management training teaches the honest sharing of feelings
In-group customers get better treatment (particularism)	Every customer should get the same treatment
Relationship prevails over task	Task prevails over relationship

Evidence of Individualist and Collectivist cultures is also seen in the workplace. Individualists focused on more personal goals and interests, some not directly relating to the workplace. In contrast, collectivists' interests focused on the workplace. The top three individualist interests in order were having a job that allows for adequate personal time, freedom to do their jobs their own way, and challenging work that would provide a sense of personal growth and accomplishment. The top three collectivist interests revolved around the workplace; they desired many training opportunities, good work space conditions (e.g., lighting and ventilation), and the opportunity to make full use of their skills and abilities. It is important to note that individualists and collectivists ranked the two sets of three factors as polar opposites depending on their position on the collectivist-individualist continuum¹; that is, if

¹ Hofstede and Hofstede (2005) note that it may be possible to distinguish collectivism and individualism as two different continua such that a person could simultaneously score high on each of these dimensions. However, they carefully note that this issue can be resolved by using a single dimension when the level of analysis is an entire society and two dimensions when the level of analysis is an individual.

they were very interested in personal time, they were completely uninterested in fully training.

3.2.4 Masculinity versus Femininity

The fourth of Hofstede and Hofstede's (2005) cultural dimensions is the masculinity versus femininity dimension. By this is meant the degree to which a society's or organization's culture, structure, and systems conform to masculine or feminine gender roles. Gender role is a well-known sociological construct referring to "expectations about the ways in which men and women should think and behave" (Carlson et al., 2000, p. 393). In this context, it refers to the social culture of an organization and whether it behaves in a traditionally masculine or traditionally feminine way. A masculine culture shows gender roles that are "clearly distinct: men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life" (Hofstede & Hofstede, 2005, p. 120). In contrast, in a feminine society, "gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life" (Hofstede & Hofstede, 2005, p. 120). Therefore, although biologically, men and women are the same around the world, their social roles may differ depending on the culture in which they belong (Hofstede & Hofstede, 2005). The extent to which a society advocates these traditional stereotypes, determines where they stand on the masculine-feminine dimension.

Hofstede and Hofstede's (2005) theoretical analysis of the types of behaviours representative of various factors that describe collectivist and individualist indices within the state, as shown in Table 11.

Table 11: Key Differences between Feminine and Masculine Societies: The State and Religion (Hofstede & Hofstede, 2005, p. 147)

FEMININE	MASCULINE
Welfare society ideal; help for the needy	Performance society ideal; support for the strong
Permissive society	Corrective society
Immigrant should integrate	Immigrants should assimilate
Government aid for poor countries	Poor countries should help themselves
The environment should be preserved; small is beautiful	The economy should continue growing; big is beautiful
International conflicts should be resolved by negotiation and compromise	International conflicts should be resolved by a show of strength or by fighting
More voters place themselves left of centre	More voters place themselves in the political centre
Politics are based on coalitions, polite political manners	Political game adversarial, with frequent mudslinging
Many women are in elected political positions	Few women are in elected political positions
Tender religions	Tough religions
In Christianity, more secularization; stress on loving one's neighbour	In Christianity, less secularization; stress on believing in God
Dominant religions stress complementarity of the sexes	Dominant religions stress the male prerogative
Religions are positive or neutral about sexual pleasure	Religions approve sex for procreation rather than recreation

The distinction between a feminine and masculine culture depends on whether priorities are placed on solidarity with the weak versus reward for the strong, aid to poor countries versus investing in armament, and protection of the environment versus economic growth. Masculine cultures strive for a performance society, where rewards are based on equity, conflict is resolved by letting the strongest win, and money takes precedence over leisure. Further, careers tend to be male dominated and few women have professional jobs. Feminine cultures, in contrast, strive for a welfare society, where rewards are based on equality, conflict is resolved through negotiation, and leisure is preferred over money. There is also a higher number of women in professional jobs and both men and women can have careers.

In terms of general normal, family and education, Table 12 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in collectivist and individualist societies.

Table 12: Key Differences between Feminine and Masculine Societies: General Norm and Family (Hofstede & Hofstede, 2005, p. 147)

FEMININE	MASCULINE
Relationships and quality of life are important	Challenge, earnings, recognition and advancement are important
Both men and women should be modest	Men should be assertive, ambitious and tough
Both men and women can be tender and focus on relationships	Women are supposed to be tender and take care of relationships
In the family both fathers and mothers deal with facts and feelings	In the family fathers deal with facts and mothers with feelings
Both boys and girls are allowed to cry, but neither should fight	Girls cry, boys don't; boys should fight back, and girls shouldn't fight at all
Boys and girls play for the same reasons	Boys play to compete, girls to be together
Bridegrooms and brides are held to the same standards	Brides need to be chaste and industrious, grooms don't
Husbands should be like boyfriends	Husbands should be healthy, wealthy, and understanding, and boyfriends should be fun

According to Hofstede and Hofstede (2005), in high Masculine cultures, inequality between father's and mother's roles is the norm. Further, in such a culture men are expected to deal with facts and women with feelings. In a feminine culture, roles are not so prescribed and both men and women deal with fact and feeling. As such, in masculine cultures, boys are encouraged to fight back and assert themselves whereas women should please and be pleased. Boys are also encouraged to play games that allow them to compete and excel, whereas girls are discouraged from fighting and rather take part in games that for the fun of being together. Feminine cultures, in contrast, discourage both boys and girls from fighting and both genders play for the same reasons, whether that is to compete or cooperate. In masculine cultures, many double standards exist. For instance, men consider chastity and industriousness as important qualities in their brides whereas women do not value these qualities in their future husbands. This moral double standard is less likely in feminine cultures where brides and grooms are held to the same standards.

Within the workplace, there are also many differences between masculine and feminine societies, as shown in Table 13.

Table 13: Key Differences between Feminine and Masculine Societies: The School and Workplace (Hofstede & Hofstede, 2005, p. 147)

FEMININE	MASCULINE
Management as ménage: intuition and consensus	Management as ménage: decisive and aggressive
Resolution of conflict by compromise and negotiation	Resolution of conflicts by letting the strongest win
Rewards are based on equality	Rewards are based on equity
Preference for smaller organizations	Preference for larger organizations
People work in order to live	People live in order to work
More leisure time is preferred over more money	More money is preferred over more leisure time
Careers are optional for both genders	Careers are compulsory for men, optional for women
There is a higher share of working women in professional jobs	There is a lower share of women in professional jobs
Humanization of work by contact and cooperation	Humanization of work by job content enrichment
Competitive agricultural and service industries	Competitive manufacturing and bulk chemistry

Hofstede and Hofstede (2005) also discovered evidence for a masculine versus feminine workplace orientation. Those who took a masculine approach to work indicated that they placed strongest value on their income, followed by acknowledgement by superiors, then advancement, and finally challenging work that led to a sense of accomplishment. In contrast, those who took a feminine approach indicated that they placed the strongest value on relationships with their managers, a cooperative as opposed to competitive work environment, opportunity for a good living area, and finally employment security. Hofstede and Hofstede (2005) arrived at this dimension because their sex analyses indicated that men and women in the study scored significantly different on these workplace attributes. However, it is wholly conceivable that an organization could reflect these characteristics and expect (e.g., feminine) or demand (e.g., masculine) corresponding behaviours from its employees. Clearly, feminine-oriented employees and masculine-oriented employees indicated dramatically different approaches to the workplace, thus similar orientations in an organization will be as dramatic. Essentially, it appears that a masculine-oriented organization will be far more aggressive and competitive, whereas a feminine-oriented organization will be far more cooperative and concerned with interpersonal relationships.

3.2.5 Long-Term vs. Short-Term Orientation

The fifth of Hofstede and Hofstede's (2005) cultural dimensions is the long-term versus short-term orientation dimension. They define long-term orientation (LTO) as "the fostering of virtues oriented toward future rewards – in particular perseverance and thrift", and short-term orientation as "the fostering of virtues related to the past and present – in particular, respect for tradition, preservation of 'face', and fulfilling social obligations".

Table 14 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in short and long term orientation societies.

Table 14: Key Differences between Short and Long Term Orientation Societies: General Norms (Hofstede & Hofstede, 2005, p. 212)

SHORT-TERM ORIENTATION	LONG-TERM ORIENTATION
Efforts should produce quick results	Perseverance, sustained efforts toward slow results
Social pressure toward spending	Thrift, being sparing with resources
Respect for traditions	Respect for circumstances
Concern with personal stability	Concern with personal adaptiveness
Concern with social and status obligations	Willingness to subordinate oneself for a purpose
Concern with "face"	Having a sense of shame

The long- versus short-term orientation is a relatively new addition to Hofstede and Hofstede's (2005) repertoire of cultural dimensions, thus it still needs some time to develop. Their arguments are compelling, however, and in general a short-term orientation focuses on speed and the finish line, whereas the long-term orientation focuses on precision and process. In addition, cultures with a short-term orientation tend to be liberal with their resources, whereas cultures with a long-term orientation tend to be conservative with their resources. Essentially, short-term orientations are far less concerned with pragmatics than are long-term orientations.

In terms of family and school, Table 15 illustrates Hofstede and Hofstede's (2005) theoretical analysis of the differences in short and long term orientation societies.

Table 15: Key Differences between Short and Long Term Orientation Societies: Family and School (Hofstede & Hofstede, 2005, p.217)

SHORT-TERM ORIENTATION	LONG-TERM ORIENTATION
Marriage is a moral arrangement	Marriage is a pragmatic arrangement
Living with in-laws is a source of trouble	Living with in-laws is normal
Young women associate affection with a boyfriend	Young women associate affection with a husband
Humility is for woman only	Humility is for both men and women
Old age is an unhappy period but it starts late	Old age is a happy period and it starts early
Preschool children can be cared for by others	Mothers should have time for their preschool children
Children get gifts for fun and love	Children get gifts for education and development
Children should learn tolerance and respect for others	Children should learn how to be thrifty
Birth order is not a matter of status	Older children in the family have authority over younger children
Students attribute success and failure to luck	Students attribute success to effort and failure to lack of it
Talent for theoretical, abstract sciences	Talent for applied, concrete sciences
Less good at mathematics and at solving formal problems	Good at mathematics and at solving formal problems

With regard to the family, citizens in long-term oriented societies tend to view marriage as a pragmatic and goal oriented arrangement and living with one's in laws is a normal occurrence. This differs from short-term oriented societies where marriage is viewed as a moral arrangement and living with one's in-laws is uncommon. People living in long-term oriented societies also perceived old age as a happy period in their lives and are considered to enter into this stage at a fairly early age, whereas short-term oriented cultures old age occurs much later and is often unwelcome. In LTO cultures children learn thrift, not to expect immediate gratification, and humility. Further, gifts given to children tend to be for educational and development purposes. Conversely, short-term oriented societies give gifts for the mere sake of fun and love. Finally, students in LTO cultures attribute success to effort and failure to lack of it and have a talent for applied concrete sciences. Student in short term oriented societies, on the other hand, attribute success and failure to luck and are less good at mathematics or solving formal problems.

Hofstede and Hofstede (2005) did not provide a table explicitly summarizing the attributes of long-term versus short-term oriented workplaces; however, Table 16 indicates the key differences between long- and short-term orientations in economics and business.

Table 16: Key Differences between Long and Short-Term Orientation: Economics and Business (Hofstede & Hofstede, 2005, p. 225)

SHORT-TERM ORIENTATION	LONG-TERM ORIENTATION
Main work values include freedom, rights, achievement, and thinking for oneself	Main work values include learning, honesty, adaptiveness, accountability, and self discipline
Leisure time is important	Leisure time is not important
Focus is on bottom line	Focus is on market position
Importance of this year's profits	Importance of profits 10 years from now
Managers and workers are psychologically in two camps	Owner-managers and workers share the same aspirations
Meritocracy, reward by abilities	Wide social and economic differences are undesirable
Personal loyalties vary with business needs	Investment in lifelong personal networks, <i>guanxi</i>
There was slow or no economic growth between 1970 and 2000	There was fast economic growth between 1970 and 2000
Small savings quote, little money for investment	Large savings quote, funds available for investment
Investment in mutual funds	Investment in real estate

The highly informative IBM study referred to frequently in this report was conducted before the fifth dimension was added. However, they also reported another recent study with 60 business leaders from Asia (long-term orientation) and the United States (short-term orientation). The results indicated differences along the short-versus long-term orientation dimension. Specifically, while Asian leaders valued work, respect for learning, honesty, openness to new ideas, accountability, self-reliance, and self-discipline, the American leaders valued freedom of expression, personal freedom, self-reliance, individual rights, hard work, personal achievement, and independent thinking.

3.3 Critiques of Hofstede's Research

Hofstede's work has been recognized as a mammoth accomplishment for the social sciences (e.g., Bond, 2002), but also criticized for several theoretical and methodological shortcomings (e.g., McSweeney, 2002). Among the theoretical criticisms of Hofstede's cultural model are the notion that "we can[not] operationalize the concept of culture" beyond the trivial and that to do so is bad research

(Wallerstein, 1990, p. 34; cited in McSweeney, 2002). Such a sentiment suggests that reliable and valid measurements of ‘culture’ are not possible. While this view was not elaborated, it appears that the crux of the argument might either be that it is too complex to dissect or that it is too metaphysical to be operationalized. With regard to the latter, the suggestion that culture is too complex might suggest that by breaking it down we lose integral pieces of the puzzle, or, moreover, that breaking it down means that the construct under study is no longer culture. The notion that it is too metaphysical to be operationalized may suggest that things that we cannot see cannot be understood let alone empirically examined. It is argued, however, that while these philosophical positions may be held by some scholars (usually natural scientists), this is what the social sciences have been doing for decades, and, further, empirical research (presented next in Section 3.4) renders these arguments moot. As such, in our view, these are not worrisome criticisms of Hofstede’s work.

Some scholars have also argued that the assumptions on which Hofstede bases his research and conclusions may not be justifiable (McSweeney, 2002). Researchers have suggested that Hofstede’s conceptualizations of national culture are problematic. Specifically, for example, McSweeney (2002) argues that Hofstede treats culture as implicit, core, systematically causal, territorially unique, and shared (McSweeney, 2002, p. 91, paraphrased), and that the beliefs in systematic causality, territorial uniqueness, and national cultural sharedness are the most worrisome. Systematic causality refers to the idea that nationality is the primary causal factor in human behaviour within a culture. In its extreme, this position amounts to cultural determinism (McSweeney, 2002). Territorial uniqueness refers to the notion that nationality “culturally distinguishes the members of one nation from another” (McSweeney, 2002, p. 92). An assumption of territorial uniqueness, therefore, suggests that Hofstede effectively ignores the variety of subcultures and substructures within a nation which can differentiate individuals, and “claims that regardless of these divisions every national population somehow shares a unique culture” (McSweeney, 2002, p. 92). Finally, Hofstede’s notion of sharedness has been criticized for variably and opportunistically referring to either the “common individual national culture” presumed to be shared invariably by every individual in that culture, or when otherwise convenient, the statistical average of the population of a nation (McSweeney, 2002, p. 93). It has been argued that these arguments are mutually exclusive; that is, if everyone in a nation shares the same characteristics, they cannot also significantly vary along the continuum of the dimension being considered (McSweeney, 2002). However, it can be counter-argued that certain cultures will exhibit intra-cultural differences within certain levels on the continua (e.g., hypothetically speaking, the United States might tend to lie between points 2 and 5 on a 10-point scale of uncertainty avoidance, whereas England might lie between 5 and 8), although it does not appear that this was Hofstede’s approach. Further, this line of argumentation ignores the fact that Hofstede used continua to measure and describe these dimensions, not checklists, thus acknowledging a position of relativity rather than absolutism. Finally, other researchers (i.e., Bond, 2002) also note that Hofstede himself warned that one should not assume that if these dimensions characterize a nation, they *a priori* represent the individuals within that nation.

Hofstede's work has also been criticized for several methodological shortcomings including the validity of the questionnaires that he used to conduct the research, poor generalizability, and lack of falsifiability (McSweeney, 2002). With regard to Hofstede's use of questionnaires to characterize entire nations and highlight differences between countries, using questionnaires to study complex phenomena is understood among social science researchers to be valid as long as the questionnaires being used are well constructed (i.e., reliable and valid). Certainly, there is some reason to be critical of Hofstede's approach as he used employee survey data rather than a questionnaire designed to tap cultural dimensions. It is also unclear whether any reliability statistics were conducted on the questionnaire items. At the very least, then, his results and conclusions require further validation using different types of methodologies such as observation, interviews, and discourse analysis. Moreover, social science researchers recognize that while questionnaires have their shortcomings, they are often the only means to get a sense of what people are thinking.

Another criticism of Hofstede's work is poor generalizability. First, in some cases, the sample sizes of countries of interest were alarmingly small (e.g., McSweeney, 2002). For example, the sample sizes for fifteen countries were less than 200 and the sample sizes for at least five countries were less than 100, in some cases, less than 50 (McSweeney, 2002). Second, only gainfully employed individuals at a single organization were examined, representing a very small segment of a nation's population who may or may not contain characteristics that are representative of the population at large (McSweeney, 2002). Thus, the generalizability of Hofstede's work could be questioned.

Hofstede has also been criticized for telling "stories" as validation for the cultural dimensions he advocates (i.e., McSweeney, 2002). This appears to refer to the personal and professional anecdotes which appear in his work that Hofstede indicates reflect the dimension to be discussed. Researchers argue that Hofstede's "stories" lack falsifiability because Hofstede alone holds the key to their truth and accuracy.

Hofstede's fifth national culture dimension, long term orientation, has also received some criticism (Fang, 2003). The fifth dimension is based on the Chinese Value Survey and was developed based on concerns that the other dimensions are biased towards the Western societies. The first issue concerning the LTO dimension is the fact that it divides interrelated values into two opposing poles but in reality this may not necessarily be how it is (Fang, 2003). In fact, many of the values at the two ends of the scale are not contrasting but are in fact interrelated (Fang, 2003).

With regard to methodology, the LTO dimension is based on the opinions of a student population (Fang, 2003). This is contrary to the other culture dimensions which are based on IBM employees. This sample may or may not be representative of the average values of the people in their respective culture (Fang, 2003). Aside from the sample, the dimension does not result from the same factor analytic technique used to validate other dimensions. Ideally, Hofstede should have added the new instrument to the old instruments and applied the same factor analytic techniques to validate the results (Fang, 2003). Given the flaws associated with Hofstede's fifth culture

dimension, many have questioned the viability and relevance for cross cultural research. As such, few studies have actually adopted the fifth dimension as a research instrument (Fang, 2003).

There are clearly several valid criticisms of Hofstede's general findings, and from a "hard science" perspective, there is a need for validation of his cultural dimensions using different data gathering and sampling methodologies. The question remains, then, whether the work of Hofstede presents an adequate base on which to ground efforts to more accurately represent culture within gaming environments.

3.4 Support for Hofstede's Research

Although there are some valid criticisms of Hofstede's work, there are also several different lines of research that provide either direct or indirect support for his views. The evidence, both theoretical and empirical shows that culture is linked to various aspects of human nature and that culture can be distinguished in a number of ways.

For instance, Markus and Kitayama (1991) have proposed that culture can largely impact upon cognitions, emotion, and motivation. In particular, they suggest that the construal of the self as either independent or interdependent can largely influence an individual's knowledge representation and expression and experience of emotions and motives (Markus & Kitayama, 1991). In Western cultures (e.g., United States), people construe the self as independent and thus their behaviour is based on their internal thoughts, feelings, and actions rather than in reference to the thoughts, feelings and actions of others. Non-western cultures (e.g., China), conversely, view the self as interdependent, such that one sees oneself as part of an encompassing social relationship and where behaviour is determined and organized based on the thoughts, feelings and actions of others (Markus & Kitayama, 1991). With regard to cognition, those with an interdependent self construal are expected to be more attentive and sensitive to others than those with independent selves and view the self and others in relation to a specific context (Markus & Kitayama, 1991).

In support of Hofstede's conceptualization of culture, empirical research has shown cross-cultural differences in various aspects of human cognition. For example, a study conducted by Nisbett, Peng, Choi, and Norenzayan (2001) found that the thought processes among Asian and Western societies differed significantly. Specifically, it was shown that social systems that exist within different culture not only influence the citizens' beliefs about the world but also their metaphysical systems, their tacit epistemologies, and the nature of their cognitive processes. Most interesting is the notion that these differences originate in ancient societies, notably ancient China and ancient Greece. Through experiments as well as reviews of historical data, Nisbett and colleagues (2001) found support that Asians have more holistic interpretations of the world whereas Westerners are more atomistic in their thinking.

In addition to cognitions, emotions, and motivation, McCrae and Terracciano (2005) study of personality across 51 cultures, found certain cultural differences with regard to personality traits. Specifically, they found that Europeans and Americans generally score higher on Extraversion than Asians and Africans (McCrae & Terracciano,

2005). Further, they found that Brazilians were rated highest in Neuroticism, Northern Irish in Extraversion, Czechs in Agreeableness and German Swiss in both Openness to Experience and Conscientiousness (McCrae & Terracciano, 2005). They also found that Asians and Africans had the lowest variability in personality traits, which could be due to a number of factors (McCrae & Terracciano, 2005). For instance, the behaviour of Asians is primarily shaped by interpersonal relationships; therefore there is more homogeneity within such cultures (Markus & Kitayama, 1991).

Culture has also been shown to play a role in shaping emotion. According to Markus and Kitayama (1991), emotions can be ego-focused or other-focused. Ego-focused emotions, such as anger, pride and frustration have the individual's internal attributes (e.g., needs, goals, desires) as the referent, whereas other-focused emotions, such as sympathy and shame have another person's internal attributes as the primary referent. Finally, the study of motivation has typically focused on individually rooted needs or motives (i.e., the motive to achieve, to affiliate, to enhance one's self-esteem) (Markus & Kitayama, 1991). However, the motives for those with interdependent selves may differ or take different forms. For instance, those interdependent selves may express or experience motives that are social or have others as the primary referent (Markus & Kitayama, 1991). Further, agency, among independent selves may be experienced as an effort to express one's internal needs, capacities, and rights, however, agency among interdependent selves may be experienced as an effort to be receptive to others, their needs and demands, and not one's own (Markus & Kitayama, 1991). Further, motives that are linked to the self (e.g., self-enhancement, self-affirmation, etc.) may take a very different form depending on the self-system (Markus & Kitayama, 1991). For purposes of the current project, this work is especially important, as it provides good evidence of the link between cultural dimensions and the very goals that people within cultures are likely to pursue.

There is also evidence of a relationship between cultural background, and the actual behaviour of people within different cultures. For example, in order to explore the impact of culture on behaviour, Volkema (2004) investigated negotiation behaviours, and the perceived appropriateness and likelihood of individuals in one of nine countries showing these specific behaviours. With regard to perceived appropriateness of using a particular behaviour, Volkema (2004) found that power distance was inversely related to perceived appropriateness of traditional competitive bargaining behaviours and uncertainty avoidance was inversely related to information collection and influencing another party's professional network. Further, the results indicate that, similar to perceived appropriateness, power distance was inversely related to likely use of traditional competitive bargaining behaviours. In contrast, uncertainty avoidance was directly related to likely use of traditional bargaining behaviours, masculinity was directly related to information collection and individualism was influencing another's professional network (Volkema, 2004).

Hofstede theorized that cultures could be differentiated from one another based on five dimensions. Consistent with his views, many other researchers have proposed theories relating to cultural patterns. Because culture is most easily captured through the overt behaviours that are produced, earlier researchers suggested using behavioural concepts for distinguishing among cultures (Dahl, 2005). Examples of

behavioural concepts that have been used in the past include kinesics (body movements), proxemics (space organisation), haptics (touching behaviour) and paralinguistic concepts, to name a few (Dahl, 2005). Although these behaviours play an important role in communication among cultures, they are difficult to study in a wider context. As such, researchers have suggested other ways of distinguishing among cultures. Hall (1959, 1969; cited in Dahl, 2005) for example, identified two dimensions of culture. The first dimension distinguishes between high context and low context cultures (Dahl, 2005). Low and high context refers to the way in which information is transmitted or communication among individuals. In a high context culture, pre-programmed information in the receiver and the setting allow for a minimal amount of information to be actually transmitted in the message (Dahl, 2005). Conversely, in a low context culture, a great deal of information is absent in the context and therefore needs to be transmitted explicitly in the message. This concept deals primarily with language and as such it is frequently used when analysing face-to-face communication (Dahl, 2005). Although a popular concept when studying communication, it has been criticized as little statistical data exists relating to where countries are located on this dimension.

Hall's second cultural dimension distinguishes between polychronic and monochronic time orientation, which refers to how cultures structure their time (Dahl, 2005). The monochronic time concept refers to the notion of "one thing at a time" while the polychronic concept refers to dealing with multiple task at one time. Similar to the high/low context concept, the time orientation dimension is useful and easy to understand; however, it lacks empirical data and therefore is more difficult to apply to research (Dahl, 2005).

Hall is but one of many researchers who has attempted to classify culture according to various dimensions. Many others, including Trompenaars and Hampden-Turner who focused on a mix of value and behavioural patterns, as well as Schwartz who classified culture according to 10 distinct value types, have proposed ways of distinguishing cultures according to various dimensions. Although other models have been proposed (e.g., Spencer and Oatey, 2000; cited in Dahl, 2005), they tend to be rather limited and only take into account one aspect of culture (e.g., time orientation, communication, etc). Hofstede, conversely, not only devised a model of distinguishing among cultures, but also managed to capture various forms of culture simultaneously (e.g., power distance, individualism, etc.).

Due to his work in the field, Hofstede is one of the most often cited social science researchers to date (McSweeney, 2002) and the importance of his work cannot be understated. Various lines of research have provided evidence that culture impacts on human goals and behaviour in a number of forms. While, others have attempted to distinguish among cultures, Hofstede's model is the only one that takes into account more than one aspect of a culture.

3.5 Summary

Culture has been defined in various ways in the literature. According to Hofstede, culture consists of values, rituals, heroes, symbols and practices, whereby values form

the core and practices (i.e., behaviours) extend across the various layers. Although many researchers have attempted to characterize the various patterns of culture, the most famous work was accomplished by the Dutch organizational anthropologist Hofstede who derived five cultural dimensions based on his work as a manager at IBM. The various dimensions include Power Distance, Individualism, Masculinity, Uncertainty Avoidance, and Long-term Orientation. Hofstede and Hofstede (2005) suggest that there are several levels of culture within a single culture (e.g., the state, the family, and work) and therefore they discuss culture in relation to these various levels.

Although Hofstede's work on culture has been groundbreaking, it is not without criticism. For instance, Hofstede has been criticized for several theoretical and methodological shortcomings. Some of the criticisms include problems with conceptualizing and operationalizing culture, poor generalizability of the survey questionnaire and issues relating to the fifth dimension.

Despite the criticism, several lines of research, both theoretical and empirical, support Hofstede's views. For instance, Markus and Kitayama (1991) proposed that culture can largely impact upon cognitions, emotion, and motivation, while, Nisbett, Peng, Choi, and Norenzayan (2001) found differences in the thought processes among Asian and Western societies view. Aside from internal processes, Volkema (2004) found evidence that culture is related to overt behaviours.

Similar to Hofstede, researchers have also proposed theories relating to cultural patterns that can be used to distinguish among different cultures. Although the literature presents a number of ways for differentiating among cultures, Hofstede's model is the most prominent and the most elaborated.

4. Modelling Complex Human Behaviour

The purpose of this section is to broadly outline the various approaches to modelling complex human behaviour that have been used in past research and application. Although a very large number of different approaches exist, this report will only focus on a few highly relevant methods to model the broader aspects of social behaviour.

In order to assist better models of personality over time, Poznanski and Thagard (2005) developed a simple input-output model incorporating internal factors such as personality traits, emotions, situation factors, including relationships and mood, and the output behaviours that are dependent on the latter factors (Figure 3).

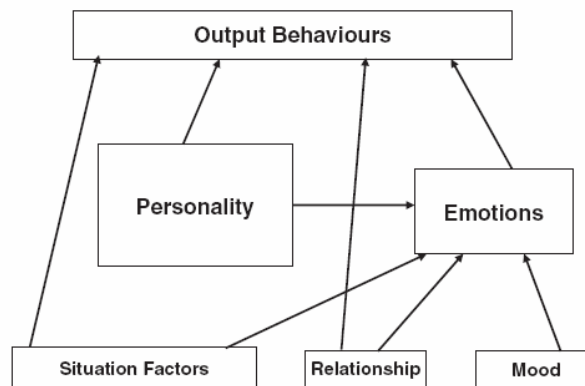


Figure 3. Overview of the SPOT Personality Model (Poznanski & Thagard, 2005, p.228)

Each of the inputs and outputs are broken down into further specific components (or nodes) that are representative of the factor (see Figure 4). For example, mood is broken down to neutral, good and bad nodes, while personality is comprised of the Big Five personality dimensions. Each node is assigned a value ranging from 0 to 1 depending on the strength of association. A value of 0 signifies that the component is not being used or is not specified; whereas a value of 1 means that there is a strong association between the component and the output behaviour. For instance, an extrovert will be strongly associated with behaviours such as talking and helping and therefore assigned a high value (e.g., 0.8), however, they would be weakly associated with avoiding and therefore assigned a low value (e.g., 0.2).

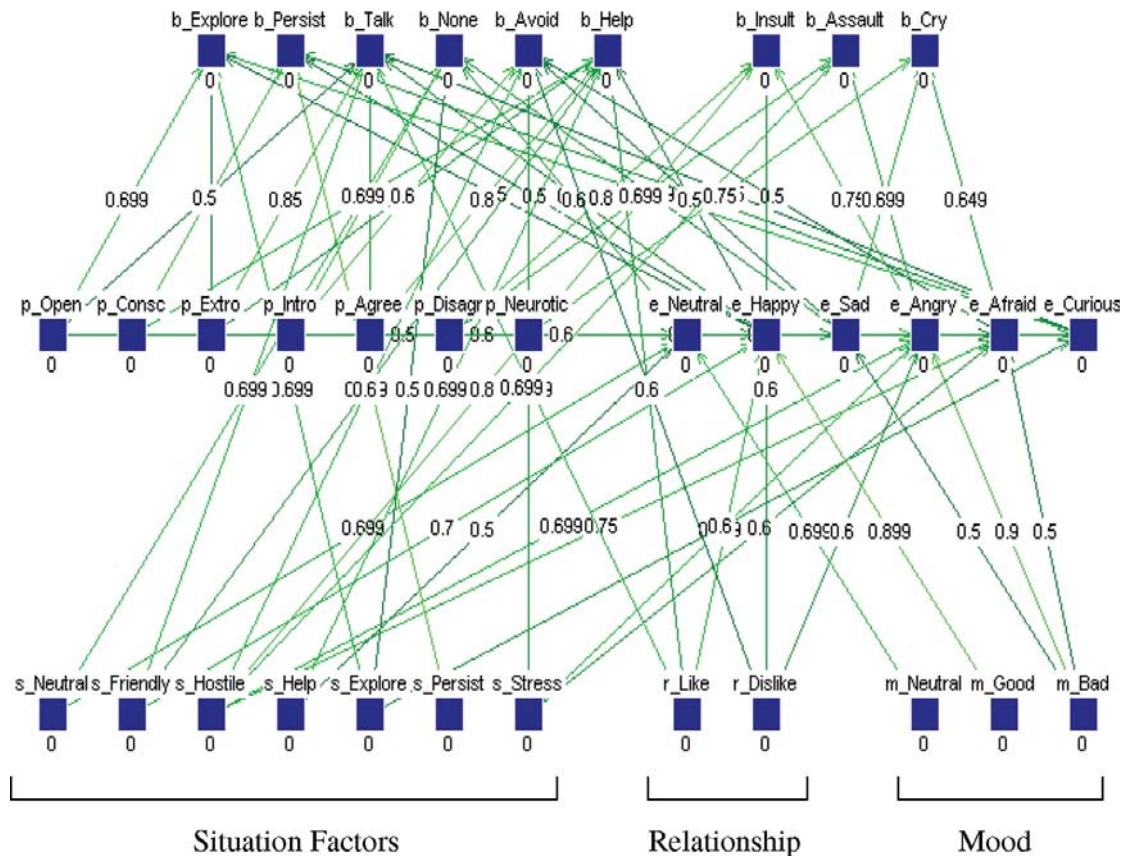


Figure 4. The SPOT Personality Model (Poznanski & Thagard, 2005, p.229)

Connections between nodes and their respective strengths were determined based on researched behavioural and emotional tendencies and common sense relating to human behaviour, personality and emotions (Poznanski & Thagard, 2005). Once values are assigned to the personality nodes and a combination of situation, relationship and mood factors has been established, activation flows within the network moving from the input layer through the middle layer to the behaviours (Poznanski & Thagard, 2005). The activation function used for each node is simply the sum of all input weights multiplied by their node's activations (Poznanski & Thagard, 2005). Although multiple nodes can be activated at the same time, only the most activated node will determine which behaviour will be carried out (Poznanski & Thagard, 2005).

The primary difference between this model and other models of personality is the modelling of personality change or development over time (Poznanski & Thagard, 2005). Because personality theorists claim that personality can and does change at the age of 30 due to environmental influence, it was important to include this in the personality model (Poznanski & Thagard, 2005). The model was such that whenever an individual would encounter a situation, the situation would change their

personality slightly and within limits, thus reflecting how the environment influences one's personality (Poznanski & Thagard, 2005). In order to handle the personality changes, certain rules were devised that would be based on the situation and its effects on personality. For example, if the situation is friendly, this would lead to more extroverted and more agreeable personality and less introverted and less disagreeable personality.

Overall, the SPOT model meets a number of criteria that would deem it a good computational model. First, it covers three major personality theories: the Big Five trait theory, Social Learning theory (due to the personality change component) and genetic dispositions (Poznanski & Thagard, 2005). Further it includes emotions and moods which are often neglected in personality models (Poznanski & Thagard, 2005). Second, the design is straightforward and can be modified (Poznanski & Thagard, 2005). For instance, nodes can be added on to the network along with corresponding connections, while the rest of the network remains unchanged. In addition, specification of personality and other inputs is simply accomplished by assigning values and memory consumption is kept to a minimum (Poznanski & Thagard, 2005). Finally, the output behaviours are fairly diverse, such that there is a degree of action choices within the model (Poznanski & Thagard, 2005). Further, the behaviours are outcomes of three interacting components: personality, situation and moods/emotions, therefore it is quite comprehensive and represents reality more closely (Poznanski & Thagard, 2005).

Bednar and Page (2005) explored the emergence of cultural behaviour through game theory; however, their framework expands the traditional single game approach through the addition of multiple games. Further, they were able to more accurately model cultural behaviour using gaming theory. Within this approach, agents can play similar strategies in distinct games and two agents may choose distinct strategies for the same game (Bednar & Page, 2005). In addition, the exploitation of subroutines across strategies can lead to intra-and inter-agent behavioural consistency or "cultural behaviour" (Bednar & Page, 2005). Therefore, with this approach agents develop a variety of strategies tailored to a specific situation, community-level behaviour patterns emerge, and diverse cultures surface due to incentives, constraints and institutional precedents (Bednar & Page, 2005). Thus, self-interested agents may play the game differently depending on the environment with which they are confronted (Bednar & Page, 2005). The use of multiple games allows the researcher to examine how the social, political and economic dimensions of individuals' lives affect the type of decisions they make (Bednar & Page, 2005).

In Bednar and Page's (2005) framework, agents play a total of six two-person, two-action games which includes incentives for being selfish and benefits from cooperating. The games differ with respect to which type of strategy payoffs (Bednar & Page, 2005). For instance, in the game titled Knife Edge, players receive the same average payoff when both alternate between being selfish and cooperative then if each were always cooperative. Strategies are encoded with the use of finite state automata, which consists of mental states, rules on how to transition between states, and initial states (Bednar & Page, 2005). Mental states are numbered and each one denotes an action (e.g., "be selfish"). The number of states represents the agent's cognitive

capacity. With multiple games, the automata must differentiate between games and define strategies for each game. This is accomplished by adding a separate initial state for each game in an agent's ensemble.

Using a classic prisoner's dilemma, Bednar and Page (2005) tested out their cultural framework. In the model, two communities of agents participated in a fishing and harvesting game. Each agent in a pair had a choice between two strategies, to cooperate or to be selfish. Although they could play different strategies in each game, they had limited cognitive capacity (Bednar & Page, 2005). The strategies for each game, however, had different payoff structures within the two communities. Using this model they found that each community exhibited intra-individual consistency, such that agents used the same subroutine in both games, and inter-agent consistency, such that agents within each community exhibited the same strategy (Bednar & Page, 2005). The model also was able to demonstrate diversity in behaviour across communities due to contextual effects (Bednar & Page, 2005). In other words, the contextual differences in the games across the two communities created differences in behaviours. Therefore, with these results, Bednar and Page (2005) argued that they were able to successfully model cultural emergence through the application of a modified game theory.

In order to create more believable agents, and therefore heighten the realism of the gaming environment, the gaming and modelling literature outlines key requirements regarding agent characteristics.

For instance, Bednar and Page (2005) suggested key requirements, which they summarized into a "wish list" that defines cultural behaviour. The list included the following elements:

- 1) Intra-individual consistency: As an individual moves from task to task, he or she responds similarly
- 2) Inter-agent consistency: Individuals with the same community, encountering the same problems will act like one another
- 3) Contextual Effects: Individuals from different communities may react differently to the same problem or phenomenon

According to Bednar and Page (2005), culture should be linked to behavioural patterns (or for the purpose of this project, to goals and goal-directed behaviours). First, culture should contain a set of behavioural traits within an individual that does not change even when placed in different situations or when performing different tasks. Second, empirical evidence suggests that people behave similar to other individuals within a community; however, they behave differently from individuals from other communities. That is to say that when encountering a problem, people from the same community should react similarly to each other, but differently from people in other communities. Therefore, ensuring that individuals behave consistently across time and with others in close geographically space is an important requirement in the programming of agents.

Poznanski & Thagard (2005, p. 225-226) suggest that computational models for believable agents should apply three specific rules: “the model should adhere to and not violate any known psychological findings”, it should be parsimonious (i.e., simple and efficient), and the “virtual characters [should] exhibit interesting and varied behaviour [as] behaviours that change over time are more human like”. With regard to the first rule, models of personality should incorporate such things as emotion, moods and environmental influences on personality (Poznanski & Thagard, 2005). Secondly, the model should have a simple design and be efficient in terms of running time and computational resources such as memory (Poznanski & Thagard, 2005). Finally, it is important to have varied behaviours as this makes for a more interesting model, make it more human-like, less cyclic and therefore more believable (Poznanski & Thagard, 2005).

Griffioen, Schut, Eiben, Bontovics, Hevizi, & Lorincz’s (2005) discuss the various features that an agent should possess. Extending the work of Wooldridge and Jennings (1995; cited in Griffioen et al, 2005), they propose that an agent should have autonomy, social ability, reactivity, pro-activeness, a lifetime, a gender, genetic features, and lifetime learning properties. As such, agents should operate without direct interventions of humans, they should interact with other agents, and they should perceive their environment and exhibit goal directed behaviour as opposed to simply reacting to their environment (Griffioen et al., 2005). Further, it is suggested that agents should go through three periods of life: childhood, adulthood, and old age and that their gender determines reproduction capabilities (i.e., only agents of opposite sex can have children (Griffioen et al., 2005). Finally, the genetic features an agent possesses may be passed on to their children and agents may learn through individual and social learning (learning information from other agents) (Griffioen et al., 2005).

To increase the believability of agents within a computational model, Loyall (1997) suggested that agents should exhibit the following characteristics:

- Personality
- Emotion
- Self-motivation
- Change
- Social relationships
- Consistency
- Illusion of life
 - o Appearance of Goals
 - o Concurrent pursuit of goals
 - o Parallel action
 - o Reactive and responsive
 - o Situated

- o Resource-bounded
- o Exist within a social context
- o Broadly capable
- o Well integrated capabilities and behaviours

Including all of the above mentioned variables could prove to be challenging. However, simulation environments that are able to model these characteristics will show a higher level of fidelity and will more accurately represent human behaviour.

Several challenges, however, present themselves when attempting to model a culture and its inhabitants. One is that the relationship between culture and goals is a relatively subtle one, and the translation from national culture to actual goals is not necessarily straight-forward. Ironically, there is also a need to separate individuals from their culture in order to model culture. Therefore, even though individuals are embedded within their culture, it is necessary to identify those factors that differentiate people from each another in order to be able to depict the impact of culture. These challenges were addressed during the implementation phase of this project.

5. Implementation

This section considers the requirements for modelling culture and proposes a method for incorporating these requirements into the gaming environment.

5.1 Requirements

This report aims at identifying how cultural diversity can be better represented within a gaming environment. The most obvious requirement is for the highest possible level of psychological fidelity, and this has a number of components.

Initially the project examined culture at the behavioural level. However, at the Interim meeting the Scientific Authority explained his requirement that the project focus more at the level of goals than behaviours.² As the result of this meeting, our focus shifted to goals hierarchies rather than behaviours. However, it should be noted that goals and behaviours are very closely related. In order to achieve goals and to meet their needs, individuals must engage in certain behaviours. Goal hierarchies and goal-directed behaviours can be conceptualized as more general correlates of behaviours. As such, a single goal might give rise to many different behaviours.

Individuals within the modelled environment should behave in a way that is consistent with their cultural background. As such, if specific goals are highly indicative of a particular culture, agents living within this cultural context should be more likely to manifest these goals than would be the case within another culture.

Agents must also behave differently from day to day (i.e. intra-individual variation) as well as being distinct individuals (i.e. inter-individual variation). The agents within the same context should also show individual variability, by responding differentially to the influence of culture. Agents should also vary in terms of their status, and this status should be responsive to external circumstances. For example, a person of high wealth and status within a community should behave differently in response to an economic downturn than a person who is on already below the poverty line. In the first case, the economic downturn could curtail lavish spending habits; for the person already on the poverty line, highly motivated food-seeking goals could be the result.

It would be necessary to create a methodology that is modifiable based on changing external events. Within a day-to-day context, the goals that individuals pursued would be somewhat consistent in a given culture; however, if a sudden external event were to occur, the change would need to be reflected in the goals that individuals adopt. As such, it would be necessary that the agents' goal-directed behaviour changed if confronted with an external event. This suggests that it will be important to create a link between the external event and the individual (and their typical goals as a person

² In order to provide the greatest possible value to longer term efforts to model culture, our earlier work related to behaviours in different cultures can be found in Annex A.

within that culture) and that their status and goals must be flexible enough to change in line with the new demands caused by the external event.

Our proposed approach to modelling culture in order to meet these requirements is presented in the sections that follow.

5.2 Individual Needs/Goals

Of course, there are many different ways to understand the needs of individuals. More specific goals can be derived from Maslow's hierarchy of needs. For example, a set of goals were drawn from a list of goals created by Roger Schank (1977; cited in Eiselt & Holbrook, 1998). These goals can also be matched with Maslow's hierarchy of needs, as shown in Table 17.

Table 17. Maslow Dimensions versus Goals

Maslow Dimension	Goal
Physiological	Food
	Health
Safety/Security	Safety
	Good Job
	Possessions
Love/Belonging	Relationship
	Sex
Esteem	Competition
	Skill
	Power
	Social Position
Actualization	Entertainment
	Travel

At a psychological level, it is perhaps not completely accurate to depict these goals as purely hierarchical, and this has the potential to obscure the full range of human behaviour. A strictly hierarchical approach would argue that people only adopt goals after previous ones have been satisfied. In actuality, however, a person depicted as having primarily safety and security goals is still likely to have some actualization needs and goals (e.g. travel and entertainment).

We propose an approach that is hierarchical in some ways but flexible enough to allow multiple goals. In order to allow for more complex "behaviour", agents are assumed to pursue more than a single goal, as well as to show changes in the goals that they pursue

over time. This would mean that, in general, lower level needs would be met first before higher level needs are pursued. This ensures changes in the individual over time or intra-individual variability. Looking at goals hierarchically, then, goals would be pursued until some standard level of need was fulfilled. At the most basic level, then, a 90% level of need would have to be met before one would move on to the next level. Moreover, specific goal-directed behaviour could “max out” at 95%, with 5% fluctuation over time directed at maintaining the goal. However, in contrast to a strictly hierarchical approach, individuals would start with several goals at different levels of activation (as indicated by level of need).

It would also be possible, then, to compare the goals likely to be adopted by low vs. high status individuals within a society in terms of relative levels of unmet need. Table 18 shows an extreme example of the goals likely to be pursued by low and high status individuals rated on a scale ranging from 1 (minimally likely to be pursued) to 10 (extremely likely to be pursued). Ratings below “5” indicate that this goal is less a need than is the case for the “average” person within this society, and ratings above indicate that this area is more a need than average (see Section 5.2.1 for more detail about how “unmet need” is numerically represented).

Table 18. Level of Unmet Need by Status

Maslow Dimension	Goal	Level of Need	Level of Need
		Low Status	High Status
Physiological	Food	9	1
	Health	9	1
Safety/Security	Safety	7	1
	Good Job	7	1
	Possessions	6	1
Love/Belonging	Relationship	1	5
	Sex	1	6
Esteem	Competition	1	7
	Skill	1	7
	Power	1	8
	Social Position	1	7
Actualization	Entertainment	1	9
	Travel	1	9

Clearly, low status/high need people are likely to need to direct their efforts toward the basics of life (e.g. food, shelter, security), whereas high status/low need people have the luxury of working toward relationships, power, and self-actualization goals.

5.2.1 Depicting Multiple Individuals

Although the previous section explains how to depict a single person within a given society, it will also be necessary to depict many different people in order to populate the simulation environment where culture is to be modelled. As such, we also considered how multiple individuals could be represented within the gaming environment. One way to do this would be to examine the demographics of the target country or society in order to understand the “baseline” status of people within the country. The demographic profile could include characteristics such as annual income, health care, occupational profile, political system, religion, and education. These demographic characteristics can be obtained from a variety of sources, such as the CIA World Fact Book, which contains information on countries around the world. This broad profile of a country would act as a baseline indicator of how life might appear and represents how this specific country might appear on a day-to-day basis without the influence of an external event.

These characteristics could then be related to the goals likely to be in play within the country. For example, in very impoverished countries (with very low annual income and poor health care), the goals of individuals at the low end of the spectrum are likely to centre on the basics of life. Moreover, even individuals at the higher end of the spectrum would be likely to still have some goals (e.g. food, job) that are less likely to be in play in more affluent societies. This profile of the target country, then, could be used in conjunction with the assumption that the characteristics of multiple people are likely to be relatively normally distributed. As such, the goals of the agents within a society would also be somewhat normally distributed around the means of the country as a whole. This assumption combined with the national demographic profile could be used to create a full range of agents who varied in needs and hence goals.

Through knowledge of the “average” status of the individuals within a given country on each of these characteristics, then, it would be possible to create a full set of agents that vary incrementally in their needs and, hence, their goals. The set of individuals would show inter-individual variation and changes in individual status allow for intra-individual variation.

As such, the entire range of human goals can be said to have a “default” probability of occurrence within a target country. It is important to note, however, that these probabilities are based purely on demographics and exclude the role of culture. Moreover, as following sections will show, this a priori probability will be influenced by culture as well as by external events.

5.3 The Impact of Culture

5.3.1 Strength of Cultural Dimensions

As noted earlier, Hofstede (2005) proposed that each country can be characterized by a score on each of the five cultural dimensions.

Although each country will have scores on all five cultural dimensions, using all dimensions in our view is also unnecessary as the most prominent cultural influences are likely to be somewhat correlated. As such, high PDI cultures also often show high Uncertainty Avoidance, limiting the culture to one dimension allows more focus on the subtleties of the dominant cultural dimension. As such, at this early stage of the project, only the most highly active dimension within a country should be included in the simulation. As such, it would be best to include only the power distance or uncertainty avoidance dimension as the dominant cultural indicator and all goals associated with this dimension.³ For the purpose of this proposal, we have assumed that Iran is the target country. Iran has a Power Distance score of 58, as shown in Figure 5.

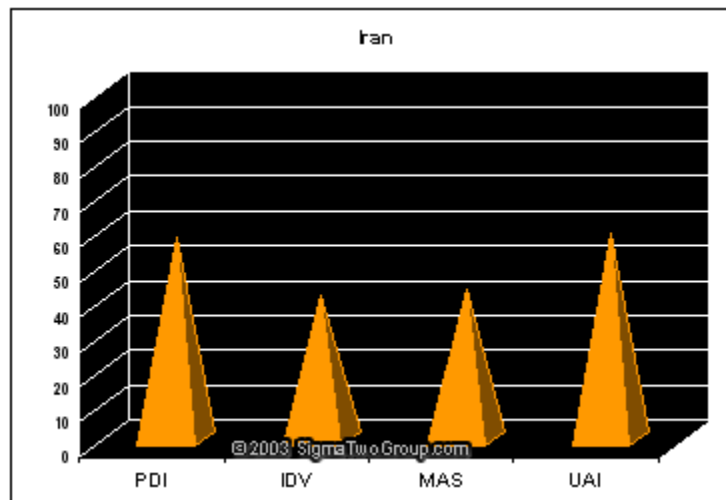


Figure 5. Iran's Scores on Hofstede's Cultural Dimensions ("Geert Hofstede Cultural Dimensions", 2006)

The high Power Distance (PDI) index is indicative of a high level of inequality of power and wealth within the society.

Our goal was to standardize this score in order to describe the position of Iran relative to other countries in the world with known PDI scores. This would be a measure of "cultural strength". For 74 different countries, PDI scores ranged from 11 (Austria) to 104 (Malaysia) (Hofstede, 2006). Converting this to a scale ranging from 1 to 10 (with Austria as 1 and Malaysia as 10), the PDI score of 58 for Iran would be transformed to 6.23 (rounded off to 6 out of 10). The cultural strength of a specific dimension (e.g. PDI), then, represents the country's standing on the dimension relative to other countries.

³ Although Uncertainty Avoidance is slightly higher than Power Distance in Iran, Power Distance is very prominent throughout Muslim countries, so this dimension is the focus in this example.

5.3.2 Linking Culture and Goals – Goal Values

The next critical issue is the extent to which the nature of the “active” cultural dimension within a given country will influence the probability of pursuing specific goals. In order to link specific goals and the cultural dimensions, we analyzed Hofstede’s cultural dimensions, and the extent to which each of these dimensions brings a particular goal to the forefront. Therefore in analyzing the nature of the dimensions, we were able to determine which particular goals were more or less likely. This analysis enabled predictions about the extent to which each goal is likely to be active within a given culture.⁴ All goals were rated on a scale ranging from -10 (minimally influenced by cultural dimension) to 10 (extremely influenced by cultural dimension) as shown in Table 19.

Table 19. Linking Goals and Cultural Dimensions – Goal Values

Maslow Dimension	Goal	PDI	UA	IND	MASC	LTO
Physiological	Food	10	1	1	1	1
	Health	8	6	3	-3	1
Safety/Security	Safety	3	9	-3	-3	1
	Good Job	3	6	-3	9	3
	Possessions	6	-3	6	9	-9
Love/Belonging	Relationship	1	-3	-8	-9	9
	Sex	6	-3	1	3	1
Esteem	Competition	1	1	6	9	-3
	Skill	3	6	3	6	6
	Power	9	1	1	9	-6
	Social Position	9	1	-6	9	-6
Actualization	Entertainment	1	-6	3	0	-9
	Travel	1	-6	3	-6	-9

For example, in a high PDI culture, in which there is a high discrepancy between rich people and poor people, one would expect that the “goal” of food would be prominent (+10), as would the motivation to achieve power (+9) and possessions (+6). It is also important to note that some goals also have the potential to be suppressed by culture. For example, communal relationship goals are likely to be somewhat suppressed in highly individualistic cultures (-8).

Identifying the most prominent goals within a specific culture was easier for some goal/cultural dimension combinations than others, as some cultural dimensions do not carry any necessary implication for specific goals. For example, although masculine cultures would clearly be highly likely to pursue competitive goals (+9), residing in

⁴ It is important to note that these analyses are subject to validation.

masculine culture carries no particular implication for the probability of having a food goal. Hence, being in a masculine culture would have no necessary implication for adopting food goals (+1)

With this, it would now be possible to estimate the probability of a specific goal being pursued within a given culture. This would be influenced by the interaction of the strength of the cultural dimension in play, and the extent to which culture makes the pursuit of specific goals more or less likely. This value can be called cultural impact, and would be derived by multiplying the cultural strength (i.e., the country's standing on the dominant dimension relative to other countries) in play with the goal value within the target culture. However, based on our review and our knowledge of the literature, we would expect for the strength of the active cultural dimension in play to be somewhat more influential than would the goal value within a specific culture. This is the case because culture is simply more pervasive. As such, in order to give more weight to cultural strength than goal value, the equation used to calculate the final cultural impact was:

$\text{Cultural Impact} = 1.5 (\text{Cultural Strength}) * 1.0 (\text{Goal Value})$

Table 20 shows the cultural impact on the specific goal probabilities for Iran.

Table 20. Cultural Impact for Iran

Maslow Dimension	Goal	Cultural Strength (Iran)	Goal Value in PDI Cultures	Cultural Impact on Goal Probability (out of 10)
Physiological	Food	0.6	10	9.5
	Health	0.6	8	7.6
Safety/Security	Safety	0.6	3	2.8
	Good Job	0.6	3	2.8
	Possessions	0.6	6	5.7
Love/Belonging	Relationship	0.6	1	0.9
	Sex	0.6	6	5.7
Esteem	Competition	0.6	1	0.9
	Skill	0.6	3	2.8
	Power	0.6	9	8.5
	Social Position	0.6	9	8.5
Actualization	Entertainment	0.6	1	0.9
	Travel	0.6	1	0.9

As such, by combining the strength of the active cultural dimension (6.3×1.5) and the probability of a goal being pursued within each culture (10), it would be possible to predict, for example, that the influence of culture in the goal-directed behaviour of “food” would be $(.63(1.5) \times 10)$ or 9.5. This cultural impact score represents the probability (out of 10) that this kind of goal would be pursued in general within the culture.

5.4 Combining Individual Status and Culture

It is also possible to depict the probability of goals being pursued as the product of both cultural milieu and individual status. This is important because people within a given culture will naturally pursue individual goals, even if these goals are influenced by culture. A low status person is likely to have needs in areas that are different from a high status person. As such, to arrive at the probability of a given goal being pursued, we multiplied cultural impact and individual need, as shown in Table 21.

Table 21. Probability of Low Status Person Adopting Goal in High PDI Culture

Maslow Dimension	Goal	Cultural Strength	Goal Value in PDI Cultures	Cultural Impact on Goal Probability (out of 10)	Individual Need (High)	Probability of Goal in Everyday Life (out of 100)
Physiological	Food	0.6	10.0	9.5	9.0	85.1
	Health	0.6	8.0	7.6	9.0	68.0
Safety/Security	Safety	0.6	3.0	2.8	7.0	19.8
	Good Job	0.6	3.0	2.8	7.0	19.8
	Possessions	0.6	6.0	5.7	6.0	34.0
Love/Belonging	Relationship	0.6	1.0	0.9	1.0	0.9
	Sex	0.6	6.0	5.7	1.0	5.7
Esteem	Competition	0.6	1.0	0.9	1.0	0.9
	Skill	0.6	3.0	2.8	1.0	2.8
	Power	0.6	9.0	8.5	1.0	8.5
	Social Position	0.6	9.0	8.5	1.0	8.5
Actualization	Entertainment	0.6	1.0	0.9	1.0	0.9
	Travel	0.6	1.0	0.9	1.0	0.9

In general, however, these needs will centre more around the basics of life (e.g. food and shelter, working) than around higher level goals (such as travel or entertainment). As noted earlier, in order to promote intra-individual variability, this model will assume that “movement” toward more complex goals only occurs when specific criteria have been reached.⁵

The probability of specific goals being pursued, however, will vary depending on the needs of the individual. As such, high status/low need people will show a different set of goal probabilities, as shown in Table 22.

⁵ Of course, although little time was available to address what happens when agents “progress” to the highest level of status, presumably, some sort of algorithm would be necessary to ensure the maintenance of goals even after they had been achieved, or at least the ability to diversify goals systematically in order to avoid stagnation.

Table 22. Probability of High Status Person Adopting Goal in High PDI Culture

Maslow Dimension	Goal	Cultural Strength PDI	Goal Value in PDI Cultures	Cultural Impact on Goal Probability (out of 10)	Individual Need (low)	Probability of Goal in Everyday Life (out of 100)
Physiological	Food	0.6	10.0	9.5	1	9.5
	Health	0.6	8.0	7.6	1	7.6
Safety/Security	Safety	0.6	3.0	2.8	1	2.8
	Good Job	0.6	3.0	2.8	1	2.8
	Possessions	0.6	6.0	5.7	1	5.7
Love/Belonging	Relationship	0.6	1.0	0.9	5	4.7
	Sex	0.6	6.0	5.7	6	34.0
Esteem	Competition	0.6	1.0	0.9	7	6.6
	Skill	0.6	3.0	2.8	7	19.8
	Power	0.6	9.0	8.5	8	68.0
	Social Position	0.6	9.0	8.5	7	59.5
Actualization	Entertainment	0.6	1.0	0.9	9	8.5
	Travel	0.6	1.0	0.9	9	8.5

In general, then, the goal-directed behaviour of low need people is more aimed at less instrumental activities, and they are more likely to pursue power and social standing.

Of course, the goals important to people at the same level within different cultures will also vary. Table 23 shows the goal probabilities for a low status person within an uncertainty avoidance culture.

Table 23. Probability of Low Status Person Adopting Goal in High UA Culture

Maslow Dimension	Goal	Cultural Strength UA (e.g. Chile)	Goal Value in UA Nations	Cultural Impact on Goal Probability (out of 10)	Individual Need (high)	Probability of Goal in Everyday Life (out of 100)
Physiological	Food	0.8	1	1.2	9.0	10.5
	Health	0.8	6	7.0	9.0	63.2
Safety/Security	Safety	0.8	9	10.0	7.0	70.0
	Good Job	0.8	6	7.0	7.0	49.1
	Possessions	0.8	1	1.2	6.0	7.0
Love/Belonging	Relationship	0.8	-3	-2.3	1.0	-2.3
	Sex	0.8	-3	-3.5	1.0	-3.5
Esteem	Competition	0.8	1	1.2	1.0	1.2
	Skill	0.8	6	5.4	1.0	5.4
	Power	0.8	1	0.9	1.0	0.9
	Social	0.8	1	0.9	1.0	0.9
Actualization	Entertainment	0.8	-6	-5.4	1.0	-5.4
	Travel	0.8	-6	-5.4	1.0	-5.4

Comparing to Table 21, then, the low status individual in this uncertainty avoidant culture shows a distinct pattern of goals than a similar status person in a PDI culture. Critical goals within a high Uncertainty Avoidance culture centre on health, safety and security (e.g. having a good job).

To this point, then, the proposed approach allows the calculation of the probability of specific goal-directed behaviours being manifested in agent behaviour in everyday life (as a product of their status) and within their dominant cultural milieu as a product of the cultural influences in play.

5.5 External Events

A critical requirement of a high-fidelity model of human behaviour would be responsiveness to changing external circumstances. As such, one would expect that the impact of an external event would be different depending on the individuals that experience the event, as well as the broader cultural context within which the event occurs. Very simplistically, the impact of an economic “downturn” would need to have different implications for behaviour than would a catastrophic natural disaster. Moreover, this impact would also need to depend on the prominent cultural dimension in play. Achieving this level of fidelity would require a specific analysis of the characteristics of the external event, and its probable impact in a typical society.

As such, depicting the impact of external events would first require rating these events in terms of their probable impact on the various areas of an individual's life and specifically on the goals that people are likely to pursue (e.g., health, relationships, safety). For example, an economic downturn may impact most prominently on basic financial needs, whereas a blockade separating a village may impact more heavily on family life or relationships. Some sample external events (and ratings of their probable impact on goals) were rated on a scale ranging from -10 (minimal influence on need) to 10 (maximal influence on need), as shown in Table 24.

Table 24. The Impact of External Events on Goals

Maslow Dimension	Goal	Economic Downturn	Village Blockade	Stricter Abortion Laws
Physiological	Food	6	6	0
	Health	2	4	5
Safety/Security	Safety	4	4	0
	Good Job	5	3	0
	Possessions (material)	4	1	0
Love/Belonging	Relationship	2	5	-3
	Sex	0	0	-1
Esteem	Competition	2	0	0
	Skill	0	-3	0
	Power (over others)	-1	2	0
	Social Position	-1	0	0
Actualization	Entertainment	0	0	0
	Travel	0	-3	3

With this in place, it is now possible to calculate the impact of an external event. Although there are potentially many different ways that an external event could impact, we have chosen to depict external events as influencing individual level of need/status. At this early level of fidelity, then, the impact of external events is manifested solely through changes in the need levels of individuals. As shown in Table 25, the impact of an economic downturn is depicted in terms of its impact on either increasing or decreasing levels of individual need. Of course, in later stages of the project, it might be possible to have these events exert subtle changes at a broader societal level.

Table 25. Impact of External Events on Goals of High Need/Low Status Person in PDI Culture

Maslow Dimension	Goal	Cultural Impact on Goal Probability (out of 10)	Individual Need (High)	Probability of Goal in Everyday Life (out of 100)	Impact of External Event	Individual Need after External Event (1 to 10)	Probability of Goal in Everyday Life (out of 100)
Physiological	Food	9.5	9	85.5	6	15	142.5
	Health	7.6	9	68.4	2	11	83.6
Safety/Security	Safety	2.8	7	19.6	4	11	30.8
	Good Job	2.8	7	19.6	5	12	33.6
	Possessions	5.7	6	34.2	4	10	57.0
Love/Belonging	Relationship	0.9	1	0.9	2	3	2.7
	Sex	5.7	1	5.7	0	1	5.7
Esteem	Competition	0.9	1	0.9	2	3	2.7
	Skill	2.8	1	2.8	0	1	2.8
	Power	8.5	1	8.5	-1	0	0.0
	Social Position	8.5	1	8.5	-1	0	0.0
Actualization	Entertainment	0.9	1	0.9	0	1	0.9
	Travel	0.9	1	0.9	0	1	0.9

As such, a low status person is even more likely to need to seek food, health, and safety and security goals after an economic downturn, whereas some goals (e.g. skill, entertainment etc.) are unaffected by this. It is important to note that the probabilities greater than 100 could be conceptualized as over determined behaviours that are indicative of very extreme or desperate goal seeking. For the future, different variants of the goals might be used to represent values above 100%.

Similarly, an economic downturn will also have a strong impact on a person of moderate need, as shown in Table 26.

Table 26. Impact of External Events on Goals of Moderate Need/Low Status Person in PDI Culture

Maslow Dimension	Goal	Cultural Impact on Goal Probability (out of 10)	Individual Need before External Event (Med)	Probability of Goal in Everyday Life (before event)	Impact of Economic Downturn on Indiv. Need	Individual Need after External Event (1 to 10)	Probability of Goal in Everyday Life (out of 100)
Physiological	Food	9.5	4	38	6	10	95.0
	Health	7.6	5	38	2	7	53.2
Safety/Security	Safety	2.8	4	11.2	4	8	22.4
	Good Job	2.8	4	11.2	5	9	25.2
	Possessions	5.7	4	22.8	4	8	45.6
Love/Belonging	Relationship	0.9	1	0.9	2	3	2.7
	Sex	5.7	1	5.7	0	1	5.7
Esteem	Competition	0.9	1	0.9	2	3	2.7
	Skill	2.8	1	2.8	0	1	2.8
	Power	8.5	1	8.5	-1	0	0
	Social Position	8.5	1	8.5	-1	0	0
Actualization	Entertainment	0.9	1	0.9	0	1	0.9
	Travel	0.9	1	0.9	0	1	0.9

Although an external event will cause the initiation of food goals for a moderate need person, for example, (as evidenced by the 95%), this goal will be “satisfied” quickly, and will give rise to higher level goals.

Similarly, even for the high status person, the impact of an economic downturn will be influenced by status and culture as well as the specific impact of the downturn, as shown in Table 27.

Table 27. Impact of External Events on Goals of Low Need/High Status Person in PDI Culture

Maslow Dimension	Goal	Cultural Impact on Goal Probability (out of 10)	Individual Need before External Event (Low)	Probability of Goal in Everyday Life (before event)	Impact of Economic Downturn on Individ. Need	Individual Need after External Event (1 to 10)	Probability of Goal in Everyday Life (out of 100)
Physiological	Food	9.5	1	9.5	6	7	66.5
	Health	7.6	1	7.6	2	3	22.8
Safety/Security	Safety	2.8	1	2.8	4	5	14
	Good Job	2.8	1	2.8	5	6	16.8
	Possessions	5.7	1	5.7	4	5	28.5
Love/Belonging	Relationship	0.9	5	4.5	2	7	6.3
	Sex	5.7	6	34.2	0	6	34.2
Esteem	Competition	0.9	7	6.3	2	9	8.1
	Skill	2.8	5	14	0	5	14
	Power	8.5	8	68	-1	7	59.5
	Social Position	8.5	8	68	-1	7	59.5
Actualization	Entertainment	0.9	7	6.3	0	7	6.3
	Travel	0.9	8	7.2	0	8	7.2

For a high status person, however, although an economic downturn within a high PDI culture would be associated with the initiation of food goals, other goals related to power and position would also be initiated.

Given the occurrence of an external event, the probability of individual goals being enacted is dependent on the interaction of individual status, culture and the impact of the external event. For instance, an economic downturn that occurs in a large power distance culture such as Iran can have a differential impact on the goal-directed behaviours of individuals in that country depending on their individual status. Those individuals who are well off would not be as adversely impacted as individuals in with lower status. As such, the behaviours of the lower class individuals would alter dramatically whereas those in the higher class would not vary a great deal. Similarly, the impact of an economic downturn on the goal-directed behaviours of those in Iran (a large power distance culture) compared to those in Denmark (a small power distance culture) would also be markedly different. Identifying the key factors that produce individual goal-directed behaviours in a culture and how they interact to

produce such behaviours is critical to the development of a realistic cultural simulation.

This approach to modelling culture within a virtual environment works to meet the identified requirements, in that it allows for intra-individual variation, as it depicts individuals as gradually moving toward more complex goals. The proposed methodology also uses demographic information from a given country as the starting point for creating agents with varying levels of need, allowing the creation of large sets of agents that show goal-oriented behaviour that is highly representative of a range of people. This approach also predicts people from different cultures as having somewhat different goals, dependent on the strength and type of cultural dimension in play. This allows for inter-individual variation. And, the proposed approach also makes specific allowance for contextual influences (e.g. external events) that are likely to impact differentially on people with different levels of goals, and in different cultures. This approach, then, makes specific predictions about individuals with varying status living in a specific culture and the goals that they are likely to adopt.

As an early effort to model culture, we believe that this approach offers a meaningful indication of how the subtleties of culture can begin to be incorporated into the gaming environment. Modelling culture is a difficult process as it includes a number of variables. Although it was not feasible to consider all possible factors relating to national culture, the factors addressed in this report hopefully provide a good start to representing culture within a gaming environment.

However, in light of the complexity of human behaviour, the current effort can perhaps best be described as reflecting a relatively rough level of fidelity. Although still at a very early stage, this project will hopefully promote the goal of incorporating culture into the gaming environment more accurately. Nonetheless, there are still many ways that this approach could (and should) be improved, and these are addressed in the final section of this report.

6 Overview and Future Directions

6.1 Overview

The objective of this research project was to identify salient characteristics that are common to cultures but yet can differentiate these cultures. Specifically, this work aimed at defining and conceptualizing psychological and broader social factors that have the potential to influence levels of human fidelity within a first person gaming environment. In order to accomplish this, the concept of culture was examined in terms of how it is defined, understood, and depicted in the literature. The literature review generated diverse theories relating to the conceptualization of culture as well as the cultural patterns used to distinguish among different cultures. Although a number of researchers have examined culture, Hofstede stands out as the most prominent cultural researcher. His work includes a model of culture in which culture can be depicted with five dimensions. This model of culture was therefore used in subsequent analyses relating to cultural modelling.

According to the literature, there are various approaches to modelling goal directed behaviour. The computer modelling literature was examined in order to identify agent requirements and modelling techniques for increasing the fidelity of a gaming environment. The literature suggested some relevant techniques which were outlined in the report. For instance, Poznanski and Thagard (2005) developed a simple input-output model incorporating internal factors such as personality traits and output behaviours, while Bednar and Page (2005) explored the emergence of cultural behaviour through game theory. In addition, researchers have proposed a number of requirements for agent behaviour. Some suggested components include intra-agent consistency and inter-agent consistency (Bednar and Page, 2005). However, although various requirements and models have been presented in the literature, no clear methodology for being able to model culture more accurately arose from our review.

However, our survey of the culture and the gaming literature (as well as discussions with the Scientific Authority) did help to identify certain requirements of the cultural modelling approach in this project. The first requirement is that individuals within a virtual environment should behave in a way that is as consistent as possible with their cultural background. Second, agents within the same context should differ in their goals and behaviour and should ideally, show progression over time. Third, it would be necessary to create a methodology that enabled responsiveness to external circumstances.

Based on these requirements, we attempted to develop a methodology that would get closer to modelling culture within gaming environments. The method for modelling cultural goals and behaviours required several steps. It was necessary to consider national demographics, individual status/needs (e.g., health, safety), as well as cultural influences (e.g., Hofstede's dimensions) on goal-directed behaviour.

The proposed approach, however, has both strengths and weaknesses. In terms of potential strengths, the proposed approach is derived from the literature and from a careful analysis of people familiar with culture. Nonetheless, as with many other “soft” science areas, culture is hotly disputed and there is little agreement about core assumptions. As such, other knowledgeable culture researchers or theorists may well wish to adopt a different approach, or to dispute the one that we have taken.

It should be clear that the true value of the cultural modelling approach is ultimately dependent to a large extent on the underlying assumptions inherent in the model. Culture, by definition, is based on subtleties and nuances that may be difficult to fully capture within a gaming environment. Some of the assumptions are represented in the tables that link culture to specific behaviours and those that depict the impact of external events. Beyond this, however, the most important form of validation is that the goals that people actually adopt in specific cultures actually correspond to the predictions arising from the proposed methodology. Although it is unlikely that a large scale validation process would be enacted in the short term, the predictions that our approach makes should be viewed as somewhat speculative and provisional, pending validation.

6.2 Recommendations for Future Development

In the longer term, it will be important to refine the levels of fidelity in the longer term, in relation to both individual status and the complexity of external events. For example, a broader set of individual goals would be very helpful, as is a broader depiction of the many factors likely to influence the goals that people pursue.

One notable example is the current failure of the model to include personality factors. Other important factors also have the potential to impact on an individual’s status within any country. For instance, personality can vary to a large extent and can also have a significant effect on an individual’s goals and behaviours. Within psychology, one prominent way to reflect this is through the Big Five personality inventories (Costa and McCrae, 1996). As such, it would be ideal for agents to vary in their personality profiles. For instance, individuals may vary in the extent to which they are open to experiences, conscientious, extroverted, agreeable, and neurotic. Given that there are differences in personality within every culture, it is important that the agents reflect this distribution of personality in the gaming environment.

Another logical extension of the model would relate to the influence of mood and/or emotions. Our review did show some evidence that artificial intelligence research has tended to depict human decision making as rational and ignored the role of emotion (Johns & Silverman, 2001). Recent theories suggest that emotions are vital to the decision making process and may in fact assist in managing competing motivations (Johns & Silverman, 2001). Therefore, including emotion in agent models will produce better decision makers and more realistic models.

In terms of how emotion might be incorporated in the existing approach, we can provide some ideas about how this might be done. At a psychological level, emotion

can be conceptualized as one small part of an individual's status at a specific point in time. In our proposed approach status and level of need are parallel. As such, in order to include emotion within the proposed methodology, emotion could be conceptualized simply as positive or negative influences on well-being. Positive emotions would include happiness, joy, excitement (-1 to 1) and negative emotions could include anger, fear, and sadness.⁶ These indicators of emotion could then impact in order to either raise or lower need/status corresponding to the achievement or frustration of goals. Very simply, people naturally vary in their emotion throughout the course of day. As one moves from one task to another, one might feel frustration at being able to meet one's needs (e.g. being hungry, but not being in position to eat) or at getting some needs met (e.g. being recognized at work for a job well done). Within future models, then, emotion could be programmed in relation to movement toward need fulfilment or need frustration. However, as the current approach works on a 1 to 10 scale, it would probably be important to use smaller increments to reflect subtle changes in emotion (e.g. .1). Similarly, emotion could also be conceptualized as being impacted to some extent by external events.

This conceptualization of emotion, then, follows a simple arousal model. Simply taking these basic arousal levels into account, however, may not adequately capture the full essence of human emotion as it does not take into account how different types of emotions can yield very different behaviours. For instance, anger and joy may produce very different behaviours. One relatively simple elaboration would be to follow the two factor theories of emotion, and to depict it in terms of either positive or negative arousal, as well as the type (positive or negative) of emotion.

Two factor theories of emotion (e.g., Lang, 1995) argue that emotions can be described using two dimensions: valence (positive/negative) and arousal (low/high) (Morishima et al, 2005) rather than just arousal alone. Positive valence includes emotions such as love and joy, whereas negative valence includes anger, sadness and fear. Although this theory is somewhat more encompassing as it separates positive from negative emotions, it is still relatively simplistic as it assumes that all positive and negative emotions have the same quality, and the same impact on goals and behaviour. In terms of maximal psychological fidelity, this is not a viable assumption. as it is highly unlikely that anger, fear, and sadness all have the same impact on people's goals and behaviour

The SPOT model developed by Poznanski and Thagard (2004) goes beyond valence and arousal by separating emotion into six categories: Neutral, happy, sad, angry, afraid, and curious (see Figure 3). This method of representing emotion is likely to perform better than the two factor theories as it deciphers among various emotions and it is more representative of actual human emotion. By modelling a diverse set of emotions rather than just valence and arousal, this approach has the potential to promote a higher fidelity model.

Clearly, there are a number of other avenues that could be pursued in order to increase the psychological fidelity of agents in the virtual environment. More attention to

cognitive factors, such as memory, information processing and attention would be very relevant to increasing fidelity. Similarly, in order to best capture human goals and behaviour, attentiveness to issues of social influence would also be critical. This would include factors such as the antecedents of rioting behaviour, how crowds accelerate and how the “spread” of information can influence these kinds of events. Similarly, at even higher levels of fidelity, the role of social identity is also likely to be a critical construct to depict in more detail. As people move through their daily lives, they move through different roles and identities, and this can influence their goals and behaviours within each of these social contexts. For example, at home, a man may see himself more as a father and treats his children with great affection. Moving into the work context, however, this person may well adapt a much more aggressive identity, and clearly has a different set of goals. At the end of the day, this person may behave differently again as he moves to leisure activities. In order to simulate more realistic forms of fidelity, it might be important to be able to depict these different forms of identity within virtual environments. This addition, of course, allows even more intra-agent variability. Most critically, increased incorporation of complex motivation into the model would also be an important contribution.

For the future, being able to depict how these different aspects of human psychology interact would also be an important contribution. Specifically, this could include consideration of how cognitive factors might interact with social factors to influence how information is processed. For example, there is an extensive body of research exploring how people process information about other people differently depending on the social category to which these people belong. As such, the act of pushing another person is more likely to be interpreted as a playful shove if the actor is a White person, but as an act of aggression if the actor is a Black person (Kunda and Sherman-Williams, 1993).

Similarly, how emotion might impact on information processing and ability to recall the information would also be of considerable importance (e.g. Chartrand, van Baaren, Bargh, 2006). There is a wide body of research relevant to mood-congruence effects, showing that people are more likely to remember information that is congruent with their emotion at the time of encoding. For example, one would be likely to remember positive information when happy and negative information when sad (Bowers, 1981). It would also be important to explore the extent to which emotion impacts on the ability to both retrieve and to store important information. Other relevant work relates to the informational value of emotions. More specifically, the “mood as information” construct argues that people often unconsciously use their current mood when making decisions, and misattribute how they made their decision (Schwarz and Clore, 1983). This psychological research might be able to help build even higher levels of fidelity into a virtual training environment.

As a whole, the proposed approach is modular by design in order to allow future development and expansion. In our view, capturing the complexities of human behaviour within the simulation environment will be a task that will likely offer considerable challenge for time to come. Nonetheless, working toward a higher level of complexity (even if this current work can only offer a small step) is still critical, as



current literature is very inadequate as to how human dimensions such as culture can be represented more realistically within virtual training environments.

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Annex A

Individual Behaviours

As was previously mentioned, this project initially examined culture at the behavioural level. As such, examples of different types of behaviours were generated in order to reflect the variations in the cultural dimensions (see Table 18). Although the focus of the project changed from behaviours to higher level goals, it is believed that the behaviours may still be informative for future research relating to cultural modelling.

The behaviours represent various domains of human behaviour and were developed based on Hofstede's descriptions of the various cultural characteristics associated with the state, family and school (see Tables 2-16). Although Hofstede provided rich information with regard to the various dimension, he did not, for the most part, explicitly provide a list of behaviours that would be associated with the different cultural dimensions. As such, it was necessary to brainstorm how the various characteristics could translate into individual behaviours. To generate a comprehensive list of behaviours, it was also necessary to rely on other sources of information.

For instance, using information relating to business etiquette within varying cultures, it was possible to generate some behaviour associated with working life. Finally simply conversing with individuals from other cultures or who were knowledgeable of other cultural societies helped produce some key behaviours that could aid in distinguishing among the various cultural dimensions. Combining the information from these various sources produced a comprehensive list of behaviours that would be both more and less probable to occur in cultures with varying primary cultural dimensions in family, work and broader social contexts.

Other Cultural Indicators and Relevant Characteristics

One set of important but indirect cultural indicators are the customs observed within a culture. Every culture has customs in which they engage in on a regular basis. These customs are seen as reflections of the culture and represent a culture's beliefs, values and norms. The inclusion of customs into a virtual environment is an important element as it heightens the fidelity of the simulation setting. For example, bowing upon introductions in collectivist societies is a customary behaviour among all those who belong to the given culture. In addition, cultural customs are a subtle reflection of the values and social norms inherent within the culture. Given the saliency and distinctiveness of this customary behaviour, this practice helps differentiate various cultures and also adds to the realism of the virtual training environment.

Cultural can also be indirectly indicated in characteristics such as through manner of dress. For instance, veiling among women in Muslim countries is a very salient and distinct custom within that culture. Importantly, specific Muslim countries also have

distinctive kinds of veils. As such, this simple alteration has the ability to reflect critical information at a very implicit level. Similarly, within highly individualistic Western cultures, depicting pedestrians with distinctive garb (e.g. a teenager with a Mohawk, leather and chains) is another way to increase the fidelity of the simulation. This suggests that analyzing the salient characteristics associated with appearance might be an important reflection of the underlying culture. As such, an analysis of cultural customs and distinctive characteristics would be a critical step in creating higher fidelity models of countries with distinct cultures.

In addition, we also considered relevant patterns of group characteristics likely to be associated with specific cultures. For example, given a highly masculine society, it could be expected that on average women would adopt a more subservient role, and men would be more likely to be in the workforce. In a more feminine culture, women and men would have more equal roles and therefore equal goals. These patterns of behaviour, then, could provide important guidance for modelling the goal-directed behaviours of computer agents.

Of course, the national demographic profile information can also be used to depict broad groupings of characteristics. For example, considering the national demographics in Iran as a country, the primary religion is Shi'a Muslim. As such, given 100 agents within the game, 89 of them would be configured to be Shi'a Muslim, 9 would represent Sunni Muslim, and 2 would represent Zoroastrian Jewish, Christian and Baha'i. At higher levels of fidelity, it would be important model the fact that people of different faiths might appear differently (e.g. in terms of clothing, frequencies of attending church, etc.).

With regard to occupational profile, given the national profile, 30 of the agents could be programmed as being part of the agricultural sector, 25 in industry and 45 in the service sector. These occupational profiles could be used within the game to simulate, for example, blue versus white collar workers, to indicate typical work that might be evident within a public place (e.g. groups of farm workers heading to the fields) etc.

Finally, education levels could be distributed such that the average would equal 11 years. Therefore, of 100 agents, although some would have 9 years of schooling, and others would have 13 years of schooling, the mean would equal 11 years. For instance, if the cultural profile is such that 60 percent of the citizens work in the manufacturing industry, 20 percent in the service industry, and 20 percent in the agricultural industry, then this could be reflected in the occupational status of agents within the gaming environment.

In addition, Hofstede's analysis also provides critical information that could be useful in defining the status of individual agents based on their culture. For instance, in a low power distance culture there would be less variability in individual differences, such as income, health, and education, however, in a higher power distance culture there would be much larger variability. Given such pattern differences in various cultures, it is important that this is reflected in the agents' characteristics. As such, the agents need to vary based on the group in which they belong. For those agents in a high power distance culture, half of them would need to be coded as reflecting a very

high income, good health and high education, while the other half would need to be coded as having very low income, poor health and little to no education.

Again using Iran as an example, group patterns are evident with regard to occupation and social status. In the Iranian culture, class often designates of the work in which men and women engage. In the lower classes, men tend to take part in the public workforce while women engage in domestic work. In the upper classes, however, both males and females are involved in the workforce. Because there are differences in occupation depending on the class in which one belongs, it is important to reflect this type of group pattern in the agent environment. Accurately reflecting group patterns within the gaming environment is critical to fully capturing the differential effects of cultural factors on individual goal-directed behaviour.

Table 28. Individual Behaviours Associated with High Power Distance Cultures

Human Domains	General Patterns - High PDI	High Power Distance Behaviours
Basic physiological needs	large income differentials	seeking food
		begging for food
		seeking shelter
		poor health care
Safety and Security Issues	higher levels of disruptive behaviour	Stealing
	more authoritarian behaviour	Violence/fighting as opposed to discussing matters
		greater police presence and using physical force
		revolutions and armed insurrection
Status Issues	status very important	Powerful people driving nice cars
	not bothered by inequality	Use of bribery
		power based on family, charisma, and use of force
		high status individuals more likely to be spending
Workplace	workplace more likely to be centralized	Subordinates are closely supervised
		big distance between higher and lower levels
		privileges and status symbols are normal and popular
		white collar jobs more valued than blue
School	obedience in school	Children listen to teachers and follow orders
		Fewer kids in school (elementary/high school)
		bullying among kids
		university only for rich
Leisure		more leisure opportunities for rich than poor
Relationships	Parents/children	Children listen to parents and follow orders
		likely to emphasize obedience
	Adults with each other	little interaction between rich and poor
		more likely to interact with own status people
	Elderly	elderly living on their own
Political systems		Power based in the state rather than individual
		little political discussion because it could deteriorate
Religious systems	Ultraconservative	Women less likely to be in prominent roles
Economics	big variability between rich and poor	small middle class, more people with extreme status
	status very important	richer countries generally lower PDI

Table 29. Individual Behaviours Associated with High Uncertainty Avoidance Cultures

Human Domains	General Patterns - Uncertainty Avoidance	High Uncertainty Avoidance Behaviours
Basic physiological needs		high stress and anxiety busy, fidgety, suspicious
Safety and Security Issues	certainty equals security	suppress uncertainty
		violent intergroup conflict when differences emerge
		motivated by security and esteem or belonging
Status Issues		new cars more likely than used cars
		experts rather than do-it-yourself home repair
Workplace	less interpositional knowledge	more self-employed
		morale likely to be lower
		punctual (check watches/public clocks)
		strong obedience to rules
		many doctors but few nurses
		less likely to change jobs, longer service
		need for rules, even if not effective
		emotional need to be busy and to work hard
		employers hands on
		better at implementing rather than inventing
School	obedience in school	Children listen to teachers and follow orders
		Fewer kids in school (elementary/high school)
		teachers inform rather than involve parents
Leisure		Racism - children avoid other children from different ethnic, religious or political groups.
		avoidance of unfamiliar risks, acceptance of familiar
Relationships	Parents/children	children closely watched by parents during play
		more stress within family life
		fewer children in more affluent countries
	Adults with each other	more expressive talk (e.g. use of hands)
		negative attitude towards young
Political systems	more restrictive and risk averse	More political intolerance
		do not disagree with authority figures
Religious systems	Ultraconservative	More religious intolerance
		More likely to be Catholic
		we have the one truth
Economics		Less risk tasking in economic domain
		advertising needs to appeal to expertise, not humour
Arts		literature more likely to deal with rules and truth rather than fantasy
		grand truth rather than relativism

Table 30. Individual Behaviours Associated with Individualist Cultures

Human Domains	General Patterns - Individualist	High Individualist Behaviours
Basic physiological needs		work to help close family members only
Safety and Security Issues		concerned about safety of self and family
		prepared to protect
Status Issues		
Workplace		more focus on individual achievement
School	obedience in school	Children listen to teachers and follow orders
		Fewer kids in school (elementary/high school)
Leisure		Racism - children avoid other children from different ethnic, religious or political groups.
		unlikely to engage in higher risk activities
Relationships	Parents/children	
	Adults with each other	larger number of looser relationships
	Elderly	
Political systems	more restrictive and risk averse	More political intolerance
		do not disagree with authority figures
Religious systems	Ultraconservative	More religious intolerance
Economics		Less risk taking in economic domain

Table 31. Individual Behaviours Associated with Masculine Cultures

Human Domains	General Patterns - High Masculinity	High Masculinity Behaviours
Basic physiological needs	men more likely to have needs met	women seeking food
		begging for food
		seeking shelter
		poor health care
Safety and Security Issues	higher levels of aggressive behaviour	men competitive, women cooperative
		Violence/fighting as opposed to discussing matters
		police using physical force
Status Issues		men more likely to be status conscious (big cars)
		men more likely to be spending on luxury items
Workplace	men more likely to be in workplace	Women in lesser positions and more traditional positions
		Fewer women in the workforce
		Men more likely to be white collar than women
		Men devote more resources to advancement and moving up
School	men more likely to be power positions	boys focus on math and science
		girls focus on arts
Leisure		leisure less important to men than work
		Boys more likely to play with boys
Relationships	Parents/children	Men more likely to discipline
		Women more likely to nurture
		Women more in charge of caring for family's needs
	Adults with each other	women more cooperative
		men more competitive
	Elderly	old men in better positions than old women
Political systems		more men in power
		fewer women in power
Religious systems	Ultraconservative	Women less likely to be in prominent roles
Economics		Men have more resources than women
		Women more dependent without husbands
		women more likely to be instrumental shopping

Table 32. Individual Behaviours Associated with Long-Term Orientation Cultures

Human Domains	General Patterns - Long Term Orientation	High LTO Behaviours
Basic physiological needs		
Safety and Security Issues		
Status Issues		thrifty and frugal
		willing to subordinate for a purpose
Workplace		focusing on learning, self-discipline
		leisure time not important
		long term attitude toward profit
		bosses and workers share same aspirations
School		children get gifts for education and development
		focus on applied concrete sciences
		good at math and formal problems
Leisure		
Relationships	Parents/children	mothers expected to have time with preschool children
		older children have authority over younger children
	Adults with each other	more likely to live with in-laws
Political systems		lower rates of imprisonment
Religious systems		
Economics		wide social and economic differences not desirable
		more likely to invest in real estate than mutual funds

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(U) This project explores the impact of culture on goal-oriented behaviour within a gaming environment. Culture consists of values, rituals, heroes, symbols, and behavioural practices and can be differentiated using five cultural dimensions (Hofstede, 1991; cited in Dahl, 2005). These are power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation.

Establishing how cultural diversity can be better represented within a simulation environment requires certain elements. The literature suggests several modelling techniques and requirements related to psychological fidelity. For the purpose of this project, developing a methodology to ensure that agents' goals are consistent with their culture and showing differential impact of culture on people with differing status are critical. The proposed approach for modelling culture includes components related to the status of individuals, and the strength of the cultural dimension in play. In representing the impact of culture, a good model would also show agents to react differentially to external events (e.g., an economic downturn). The proposed methodology for incorporating culture into the simulation environment as well as recommendations for a longer term project is presented.

14. **KEYWORDS, DESCRIPTORS or IDENTIFIERS** (Technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selected from a published thesaurus, e.g. Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus identified. If it is not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title.)

(U) agents; cultural dimensions; goal oriented behaviour; hierarchy of needs; simulation environment

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