

## **Designing for Diversity: Multi-Cultural Characters for a Multi-Cultural World**

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### **I.-INTRODUCTION:**

Most of the research within the field of interactive characters has concentrated on generating guidelines, or models, for believable individual variability among characters, often based on psychological personality models (such as Nass, Isbister and Lee, 2000), or biological behaviors (for example, see Blumberg, 1994). In contrast, we ascribe to Bates' proposition that "believability will not arise from copying reality," (Bates, 1994) and moreover, we suggest that recent research discoveries (such as Reeves and Nass, 1996) point towards a different fundamental orientation towards our interactions with computerized systems, given the additional cognitive processing required to maintain awareness of the mediated and created nature of the interaction.

If - as this research suggests - what is primal of our interactions with the world is our suspension of disbelief, and ascription of human-like emotions to inanimate and barely animated objects, then rather than concentrating solely on creating and fostering our users' "suspension of disbelief" through individual variability in synthetic characters, we suggest that simultaneous research efforts should explore the characteristics of breakdown moments when the deferment of questioning fails, when the "suspension of belief" is activated so that character designers may avoid such pitfalls in the future. Moreover, we advise that character design should expand its individual variability focus to include pursuits of cultural variability.

To that extent, we present a framework for the ten key characteristic qualities that animate characters (Hayes-Roth and Doyle, 1998) - distinguished from other synthetic characters by their lively autonomy and individual personas - should possess, as perceived and ascribed by the interactors. These ten key qualities that we have identified are: identity, backstory, appearance, content of speech, manner of speaking, manner of gesturing, emotional dynamics, social interaction patterns, role and role dynamics. We will briefly describe each before demonstrating their applicability to character design by localizing one of Extempo's animate learning guides to three different cultures: Brazilian, Venezuelan, and American.

Before proceeding, let us present an example of how the ten characteristics we identify become salient during a typical interaction with one of Extempo's Learning Guides, Kyra. Kyra is an animate character with whom visitors to the Extempo website

(www.extempo.com) may interact with by typing in textual utterances. Kyra's mysterious anime background and super powers are designed to appeal to pre-teens, sometimes dubbed "tweens" in market research, as they are in between the childhood and adolescent markets (see Hymowitz, 1998, for detailed definition). Kyra seeks to motivate and educate this challenging demographic on artistic expression values, and art history tendencies. She presents this enlightening "Quest" through an internet browser's image displaying capabilities, with her gestures, textual and spoken utterances. Moreover, Kyra has a complex natural language understanding engine, and a mood system that allows her to respond appropriately and adapt to even the most rude and stubborn students.

**Image 1: Picture of the Interface to Interact with Kyra**



As she explains in her own words, Kyra will never rest until she has conquered the invading forces from the realm of Negativity, Oppression and Ignorance who threaten to invade and contaminate our world of Art, Wisdom and Creativity.



Kyra is presented as a "tween" herself, slender but athletic, often executing martial arts maneuvers to illustrate her points, dressed in a futuristic uniform. Having magical powers does not free Kyra from the typical pre-teen concerns and angst that she empathizes with her audience on: she has her courses at the Academy, her best friends and her crush to worry about, and then there is that telltale colored streak in her hair that foretells her passion for the arts to even the most casual observer.

Table 1 features a sample of Kyra's recorded interactions - where a human visitor types in comments and the character reacts accordingly - to highlight each of the ten characteristics we mentioned earlier, grouping those qualities that are often expressed or presented simultaneously. We provide a textual description of Kyra's verbal responses - which appear both as text and spoken through the text-to-speech engine to the interactor - and graphical actions.

**Table 1: The Ten Key Perceived Qualities of Characters  
Expressed in Kyra, the Extempo Art Learning Guide**

<b>Quality</b>	<b>Description</b>	<b>Expressed in Kyra through...</b>
Identity	Who is Kyra?	Kyra is a trendy girl of about twelve, whose first statement to the visitors is: "Greetings Mortal! I am Kyra, Chief Defender of the Arts!"
Backstory	What shaped who Kyra is?	"Professor Yamamoto, alias Captain Y, found me on his doorstep as a baby and taught me all about defending creativity from ignorance's dark side!" Kyra's adoption by Captain Y and educational emphasis on artistic understanding drives her passion for the arts.
Appearance	How does Kyra's embodiment limit, expand, and communicate who she is?	Kyra is presented as an anime rendition of a trendy young teenager, with expressive eyes, a streak of painted hair, wearing a futuristic outfit.
Content of Speech	What does Kyra want to talk about, what does she avoid, and how does she say things?	Kyra enjoys discussing her present her friends, magic powers, favorite pastimes, and her job, often using trendy, teenage words such as "like," "as if," "whatever."
Manner of Speaking and Manner of Gesturing	How does Kyra express herself verbally and non-verbally?	Kyra often teases and interrupts the interactor, and accompanies some utterances with shrugs, winks, and even martial arts movements.
Emotional Dynamics	What angers or excites Kyra, how does she express it, and how long does this emotional charge last?	Kyra thoroughly resents derogatory comments about her intelligence, is embarrassed by any references to her "secret" crush at the Academy, and deeply saddened by the passing of Professor Yamamoto.
Social Interactions Patterns	How does Kyra address and react to those she interacts with? Does it change depending on gender, age, position, knowledge, or time she has known the interactor?	Kyra is a young teenager intent on educating those that interact with her on the importance of art and the accomplishments of many artists, and she addresses interactors as peers. She chooses what to expound on based on her interactor's knowledge of the topic.
Role	What value does she add to the web-site? What is her "job"?	Kyra is employed at the Extempo site to be a learning guide introducing young teenagers to art history and appreciation. Currently, her most popular lesson is the life and times of Vincent Van Gogh. Her role affects every aspect of her performance, as she constantly directs visitors to topics, activities, and web-pages related to it.
Role Dynamics	How does she relate to human interactors in accordance with her role?	Kyra is a tutor, how she reacts to users' errors and triumphs is dependent not only of her moods at the time, but also on her personality and cultural-specificity.

## **II.- MOTIVATION:**

As some researchers in the field have recognized (for example, see Perlin and Goldberg, 1996) the artistic emphasis in character design may be preferable to the psychological- or

biologically driven models of recognizable human behavior. Hayes-Roth and Doyle (1998) remark that biologically correct behavior may be subtle and difficult for observers to interpret; moreover, it may also appear stilted and robotic when implemented through the present limitations of graphical animations. Psychological modeling may believably render individuals with significant deviations accurately, but generating everyday humans may require extensive interaction sessions to capture the uniqueness of each individual. In contrast, perhaps due to what Bates' (1994) describes as the cumulative experience of producing hundreds of thousands of individual, hand-drawn, flat-shaded line drawings, moved frame by frame, "forced animators to use extremely simple, nonrealistic imagery, and to seek and abstract a precisely that which was crucial...to express the essence of humanity in their constructions."

We therefore ground our exploration of the dimensions of character design on identifying situations where the suspension of belief may be disrupted, and join character animators in their quest for believability, rather than from a realist framework. "That is what we were striving for...belief in the life of the characters." (Jones, 1989). While there are identifiable advantages to mimicking and matching users' central psychological tendencies, and in particular within the realm of persuasion (Nass and Reeves, 1996), we believe that for a character to be believable and engaging he or she need not match our personality. Yet even as believability is not dependent on accurate simulations, it is highly dependent on the viewers' ascription of emotion to the created characters, as these emotions are key to revealing how and when "the characters appear to think and make decisions and act of their own volition. It is what creates the illusion of life." (Thomas and Johnson, 1991)

Flannery O'Connor observed that "it is the characters who make the story, and not the other way around." Yet the types of characters needed for an engaging story may have to be, of necessity, characters whom we may not wish to emulate, nor those that resemble us, just as engaging individuals we encounter need not match our personality or lead exemplary lives. Many of the greatest characters of literature have intentionally been crafted as scoundrels - including O'Connor's - and the gifted Disney animators Thomas and Johnson even claim that without their villains, the beloved Disney heroes would lose their appeal, as only a worthy nemesis forces a hero to rise in defense of what is right (Thomas and Johnson, 1993).

Even if we would prefer not to lead the life of Hamlet, Don Quixote, David Copperfield, Snow White's Queen, or Scarlett's O'Hara, and would not make the same choices as Wile E. Coyote and Donald Duck, we nonetheless appreciate their ingenuity and endurance, enjoy their triumphs and share their sorrows. Therefore, rather than looking a central tendency among all people and our characters, we seek instead a metaphorical match similar to that of characters in narratives, film, and television, giving our characters interesting variations, similar to the interesting variations we see among people, as this is an essential element of human - and characters' - appeal. Chuck Jones, creator of many beloved Warner Brother's cartoon characters recommended to budding animators that they "eschew the ordinary, disdain the commonplace....it is the individual, the oddity, the peculiarity that counts...If you have a single-minded need for

something, let it be the unusual, the esoteric, the bizarre, the unexpected, such as a cat hooked on grapefruit."(Jones, 1989)

Interesting sources of variation need not just be individual, but may also be cultural, despite the relative research preference in character design for exploring individual personality variations. The role of cultural sameness of interactors has been proved to be as important as psychological matching, particularly in terms of persuasion. Osbeck, Moghaddam, and Perreault, point out: "studies across multiple cultures suggest that individuals and groups are more inclined to like those characters that they perceive as (culturally) similar to themselves," (1997) and recent research by Nass and Lee (2000) proves that characters from the same ethnic background as the interactor are perceived to be more socially attractive and even more trustworthy, than those from different backgrounds than the interactor. Participants in these experiments, moreover, also conformed more to the decisions of the ethnically-matched character and perceived the character's arguments to be better than those of the ethnically-divergent agent. Therefore, even for those that seek to design characters to match the user's ethnicity -and perhaps even central psychological tendency - culturally localizing characters is key. Untapped roles for which characters of certain cultural backgrounds are desirable, independent of the cultural background of the interactor, are also plentiful even outside the realm of persuasion: teaching culturally-specific subject matter - from language practice to cooking - castings for entertainment and narrative roles, among others.

Localization of characters must go beyond the obvious language translation. Just as adapting interfaces to different countries requires not only changing the language, but moreover, redesigning the interface's appearance, content, and interactive behaviors that could be considered inappropriate for that country (Miller, Kozu, Davis, 2001), adapting a character to a different culture involves careful reconsideration of each of the ten key characteristics we identified earlier. These characteristics - identity, backstory, appearance, content of speech, manner of speaking, manner of gesturing, emotional dynamics, social interaction patterns, role and role dynamics - both define and are defined by each character's unique idiosyncratic behaviors and signature personality traits, as well as by the character's cultural grounding. Even as each human personality is unique, each culture tends to evoke specific modes of adjustment and reactions in different situations (Ewen, 1988).

These cultural variations among people are responsible for the considerable diversity of specific cultural norms, even among populations located geographically near, and for many embarrassing moments in multi-cultural exchanges. They give us cultural stereotypes that allow members of particular cultures to recognize each other, and to ascribe cultural backgrounds to individuals they encounter in everyday life. Cultural stereotypes can be positive constructs, a way of describing patterns of diversity in human behavior that make our interactions with human beings rich, interesting, and delightful -- without offending the represented culture. We must, however, highlight the critical importance of user testing culturally- or group- specific characters with user populations of both the represented culture and other cultures, to preserve the delicate balance in a successful culturally- or group- specific character - where both the represented culture

recognizes itself in the character, and simultaneously, members of other cultures also ascribe the desired background to the same character, without offending either group of potential users.

### **III.- A MULTI CULTURAL PERSPECTIVE OF THE TEN KEY QUALITIES OF ANIMATE CHARACTERS**

We can represent these sets of culture-specific central tendencies for each of our ten key qualities of characters, and to illustrate how these qualities can be instantiated towards providing a blueprint for the design of culturally specific characters, we have built three culturally-specific instances of Kyra. American Kyra shares with Brazilian Kira and Venezuelan Kirita the same identity, embodiment, and teaching role, yet differ in the remaining seven key qualities of animate characters we enumerated earlier: backstory, content of speech, manner of speaking, manner of gesturing, emotional dynamics, pattern of social interaction, and role relationships.

By maintaining the embodiment, identity, and teaching role constant we aimed to highlight the significant degree of cultural specification possible within the typical project constraints and deadlines. That is, given an existing successful character, how can the key qualities we identify guide the localization of the character to other cultures? Ideally, the cultural specificity and focus of a character pervades every aspect of the character's development, yet consistency of character and role across the various cultures s/he operates in is critical for the purpose or branding of the character's sponsors, and often the underlying engine and animations prove too expensive and time-consuming to localize for every culture that the animate character will operate in.

Let us now describe and highlight how each of the qualities enumerated above and exemplified in Kyra are particularly salient within the framework of cultural specificity.

#### **Ten Key Qualities of Animate Characters**

- Identity
- Backstory
- Appearance
- Content of Speech
- Manner of Speaking
- Manner of Gesturing
- Emotional Dynamics
- Social Interactions Patterns
- Role
- Role Dynamics

**I.- Identity:** Who *is* the character? Identity encodes not only the character choice in terms of demographics and description, but also the personality traits and qualities of the character, including what she or he likes, dislikes, and the character's signature and idiosyncratic behaviors.

As many successful implementations of text-based characters dating back to Weizenbaum's Eliza (Weizenbaum, 1966).and more recently, Foner's Julia (Foner, 1993) demonstrate, a character's identity is a distinct category from appearance. Disembodied text characters amply convey a sense of personality and identity, to the

extent that participants often shared personal information - even private details- with both agents mentioned, and frequently asked Foner's very popular chatterbot Julia to go on off-line dates. An animate character's appearance merely represents graphically certain aspects - such as age, gender, and socioeconomic background - of the character's identity. Theories of self abound, ascribing aspects of identity to genetic markup, personal history and experience, even religiously determined - the aim of this paper is not to settle such a debate, nor to specify the artistic or theatrical requirements for engaging personalities, but rather to highlight the percolation of cultural norms and roles, as they impact the character's identity, in every characteristic of the interaction. By choosing a child as a character, for example, cultural conventions dictate how the character will address visitors, depending on their age.

By choosing a female character to specialize culturally, in Kyra, we are tackling the challenge head on, as the social roles of women vary across cultures in significantly more nuanced and often unexpected ways than those of men. Women have not explicitly participated in the business world until recently in most countries, and in some fundamentalist societies may be explicitly discriminated from interaction with members of the opposite sex. Even in first world countries, people will assign certain professions and roles to particular genders, and on average, express less confidence in a voice-over statement when the stereotypical gender assignment is reversed (Nass, et al, 1997). Moreover, even the most banal conversational exchange - such as appropriate responses to flirtation and banter between the genders - can break the engagement.

**II.- Backstory:** We use the term backstory to refer not only to cultural variations in individual reactions, but to any self-recognized individual experience and history that had a direct influence on the character's personality, as well as current facts of the character's "life" outside the screen. We can draw a parallel between the aspects that we group under a character's backstory and what a person would write in their diary or memoirs, as opposed to unrecognized and unconscious personality traits and quirks which would be categorized under Identity. The character's backstory encompasses family relations, friendships, favorite sports and colors, important celebrations, love interests, financial status, political and religious affiliations, yet excludes the fact that the character unconsciously rubs his/her nose when embarrassed, tends to pedantically interrupt interactors, among other personality traits. Even as each human personality is unique, each culture tends to evoke specific modes of adjustment and reactions in different situations (Ewen, 1988), and therefore, every character will inevitably highlight some cultural grounding from his or her backstory in their commonplace interactions.

When we enumerated the ten key qualities of animate characters we alluded to their intertwined nature, as every other of the eight remaining characteristic we enumerated should convey aspects of each animate character's identity and backstory - we will continue using our case study of Kyra's localization to three different cultures to illustrate the possibilities available to character designers.

**III.- Appearance:** appearance refers to the encoding of each characters' identifying demographic information - age, weight, gender, socioeconomic background and culture –

in the chosen embodiment of the character, as well as the representation of this embodiment. Characters without graphical representations still have an Appearance, encoded by the word choices of their descriptions - for example, one can describe a character with the same identity as "fat," "chubby," "round," "pot-bellied," "overweight," and even "robust," with each word alluding to a different interpretation, and cultural implication, of the same character.

Appearance affects the character's effectiveness and credibility at performing their assigned role, and directs the patterns of interaction. Even before the character speaks a single word, even before the page is completely loaded, the visitor has already processed the subliminal cues embedded in the characters' representation, such as the relative status and occupation of the interactors, and formed a model of what pattern the ensuing interaction will follow. Even such a subtle distinction as that between peer-to-peer and superior-to-underling can be deduced from the social norms and cultural cues the character's appearance presents.

Character designers must take care to understand the gender roles, traditional attires, and cultural norms that will impact every user's experience differently just by looking at - or reading a description of - the character. Moreover, it is critical to choose a representation of the character that will appeal to the targeted population, and to choose an attire that will also be considered acceptable - or at least neutral - to the target population. An American web-guide at an on-line wedding registry would probably wear a white dress, whereas in a site aimed at Chinese brides, the character would wear red, and avoid white at any cost, as white is considered a color of mourning in Chinese culture. Similarly, a punk cartoon-rendered character may not be the best match for a role mediating executive conference calls.

In choosing to maintain Kyra's appearance constant, we provoked stronger than anticipated reactions in our Brazilian testers because of the incongruity of her colored hair within their daily experiences and culture, perhaps due to their relative lack of exposure to the Japanese animation tradition of manga and anime, which American Kyra was designed to emulate to the extent that the character even spouts haiku poetry on occasion. The design recommendation we can offer is to choose representations whose appearance provokes no strong negative reactions in any culture, whenever the expectation of cultural localization arises, rather than representations which inspire positive reactions only in some cultures but inspire strong negative reactions in other cultures. Nonetheless, we should temper that recommendation with the warning that choosing too bland and adaptive a character might detract from the character's appeal in any culture - that is, designing a character within the zone of indifference of several cultures will not lead to its success as a localized character for any of those cultures, unless other aspects of his - or her - persona are also localized to each culture.

**IV.- Content of Speech:** When considering how an agent should change between countries, language is the first porting issue that comes to mind, yet the available topic choices for the character may present even more salient cultural cues. We will analyze some of these topic knowledge requirements in detail shortly, yet it is worth mentioning



the importance of matching the language, and dialect, of the character with the culture it represents as closely as possible. Our Brazilian Kira's dialog was authored to reflect her Brazilian roots and upbringing, and she speaks not only through printed text, but also through a text-to-speech synthesis that accurately distinguishes the pronunciation of Portuguese words as Brazilian, rather than the Continental Portuguese variation. The difference between these two is so noticeable to native speakers, that it is common for Portugal-born visitors to be mistakenly asked where in Italy they were born, when travelling through the interior of Brazil.

Our characters should speak in a way that the intended audience understands - which goes beyond mere language to encompass idiomatic expressions, slang and colloquialisms, and sensitively tailoring word choices to the semantic shades of meanings each cultural group has. For example, the French word "gosse" would mean "kids" to a Frenchman - but a very private male body part to someone from Quebec! Even though they both speak English, an American character would utter sentences whose syntactic content would be very different than a British agent, or an Australian one, even with the semantic content.

However, by concentrating on the syntactic content of the character's utterances, character designers may run the risk of overlooking the cultural diversity present in the semantic content itself. Alluding to certain culturally-diverse topics can enhance the character's perception as a representative of specific cultures - local historical incidents, geographical details known only to locals, religion, sports, favorite pastimes, recent local events, holidays, politics, and humor, among others (Axtell, 1985). Moreover, the treatment of certain sensitive topics traditionally associated with high emotional content - such as embarrassing or dishonorable situations (such as layoffs) , rites of passage (such as birth and death) - often varies across cultures.

Each of our Kyra triplets is quite different from one another in terms of their respective cultural topic knowledge - for example, while American Kyra composes her own haikus, loves Jackson Pollock and mint chocolate chip gelato, Venezuelan Kirita enjoys Merengue, the art of twentieth century Venezuelan kinetic sculptor Carlos Cruz Diez and loves the traditional corn-flour arepa sandwich. Brazilian Kira prefers capoeira to soccer, although she shares her countrymates' pride in legendary soccer star Pele, and admires the art of Aleijadinho, a famous Brazilian Baroque artist from the eighteenth century.

A telling example of ways in which culture affects the characters' presentation and identity lies in how each of the Kyras approaches the issue of Kyra's abandonment and adoption as a toddler. For the American Kyra the issue is significantly less shameful than discussing her present crush - if asked about her family she openly explains "I'm an orphan, and no, I don't mind being one. There's an interesting story behind that. Would you like to hear it?" Venezuelan Kirita hopefully explains "Soy huérfana, pero no pierdo la esperanza de encontrar a mis padres algún día. Mi única familia es el Prof. Yamamoto, quien me crió." ("I am an orphan, but I haven't lost the hope of finding my parents one day. My only family has been Professor Yamamoto, who raised me.") In contrast,

Brazilian Kira sadly categorizes her state: "Eu sou orfa. Nao eh bom ser orfa. Eu nao sei se meus pais verdadeiros estao vivos ou mortos." ("I am an orphan. It is no fun being an orphan. I don't know if my real parents are alive or dead.")

Moreover, the phrasing of the character's utterances - beyond the use of colloquial expressions and culturally specific word choices - may also play an important role in establishing each character as a genuine representative of the culture they portray. Markus and Kitayama (1991), suggested that Americans may value autonomy and internal consistency with past actions, as well as personal expressions of uniqueness from others and from the environment. However, the researchers suggest that these cultural traits may not be present, or at least, may be present to a much smaller degree in other cultures, in particular Asian cultures.

Individuals from individualistic cultures emphasize interpreting and explaining reasons for feeling, thinking, and acting in terms of attributes perceived to be internal to oneself and independent of external, social forces. However, in collectivist cultures, the individual's thoughts, feelings, and behaviors are organized, experienced, and explained in terms of social relationships, roles and responsibilities. Characters can - and often do - conform to such norms of behavior. The earlier anecdote of Brazilian Kira's hair controversy illustrates the Brazilian rejection of emphasizing individuality, and the greater degree of collectivism in the Latin American cultures, and leads us to suggest to designers of culturally specific characters that in collectivist cultures questions and statements implying personal agency should be avoided in favor of those emphasizing relationships (Miller, Kozu, Davis,2001).

**V.- Manner of Speech:** Not only is what is said important - the topics addressed - but also how and when it is said. The acoustic characteristics of speech - intonation and pronunciation, with the appropriate variation for the localization of the character, for example, are particularly important to differentiate characters from cultures where appearance cues do not convey the necessary degree of specificity. Other characteristics of speech that transmit the essence of each character and their cultural specificity to their interaction partners, even without text-to-speech engines, are timing, speed, and the frequency with which the character uses slang words; sentence length, choice of complex or simple words, frequency and choice usage of conversational crutches (such as "hmm," "uhm," and "like"), and stuttering, among others. A teenager may speak the same content semantically than an adult from a particular culture, using culture-specific words and references, yet pepper the syntactic content of their speech with trendy age-appropriate words and conversational crutches.



For comparison purposes, we feature below an exchange where each of the Kyras has waited for an answer to a question she asked for a full minute, and before continuing to wait, they remind the interactor in their own individual "voice" not only of whose "turn" it is in the conversation, but also of how to interact with the character, on the off chance that the interactor may be confused as to how to communicate with her. As the interactor's inactivity period lengthens, the bored

character decides to use the opportunity to recharge her energy, and after warning the user she'll be going to sleep, Kyra, Kira and Kirita proceed to do so. We should note that the inactivity period that enacts the sleep response varies in its duration for each of the three Kyras, although in the transcript below it has been edited to compare the utterances and actions of each character. When the interactor finally reacts to the sleeping character she wakes up (see image on the left) with a characteristic utterance for each of their personalities.

**Table 2: Manner of Speaking  
Kyra's, Kirita's and Kira's Reactions to Inactivity**

<b>American Kyra</b>	<b>Venezuelan Kirita</b>	<b>Brazilian Kira</b>
"I hope you haven't forgotten about me, superstar! Type something into my text box to get the ball rolling again.	"Espero que no me dejes aqui plantada esperando mucho tiempo. Escribeme algo en la caja de texto de aqui al lado en cuanto puedas." ("I hope you don't leave me here standing too long. Write me something in the textbox next to be as soon as you can.")	"Nao se preocupe, leve o tempo que precisar. Quando quiser digite a sua resposta na minha caixa de texto." ("Don't worry, take the time you need. When you want to, type your answer in my textbox.")
Interactor remains inactive.	Interactor remains inactive.	Interactor remains inactive.
> The character yawns.	> Kirita bosteza	> O personagem se expreguica.
Interactor remains inactive.	Interactor remains inactive.	Interactor remains inactive.
"I'm going to get some inspirational thinking done while you do what you need to do, mortal. Just start typing when you want me again."	"Bueno, ya que tu tienes otras cosas que hacer, yo me voy a echar la siesta. Despiertame cuando quieras seguir hablando tipeando en la caja de texto de aqui al lado." ("Well, as you have other things to do, I will take a nap. Wake me up when you want to continue our conversation by typing in the text box next to me.")	Vou tirar uma soneca para refrescar a cuca. Quando quiser falar comigo novamente, basta comecar a digitar na minha caixa de texto. ("I'm going to take a nap to refresh my head. When you want to speak with me again, just start typing in my text box")
Interactor remains inactive.	Interactor remains inactive.	Interactor remains inactive.
> The character goes to sleep.	> Kirita se queda dormida	> O personagem vai dormir.
Interactor types "Hey!"	Interactor types "Epa!"	Interactor type: "Oeh!"
"Well, that's enough of that!"	"Gracias por despertarme - ya me sentia como la Bella Durmiente!" ("Thanks for waking me up- I was beginning to feel like Sleeping Beauty!")	"Vamos voltar a nossa atividade!" ("Let's get back to what we were doing!")

Before we move onto non-linguistic expressions of culturally specific animate characters, we must warn of the particular care should be taken with the first impression that the interactor will have of the character, as it will affect every exchange between

them, and it is important to address appropriately the interactor from the first moment on. Title usage and familiarity are key: some cultures prefer a first-name basis even in the most formal occasions (such as is the case in Thailand and Iceland); others reject addressing someone by their first name unless several years of close communication have elapsed. Americans are notorious for avoiding most titles, while many Latin American countries title as "doctor" anyone that has completed undergraduate studies or in a position of authority. Special care should be taken not to generalize across geographical boundaries; for example, within the same situation, Antonio Martinez Campos would respond to Sr. Martinez in Venezuela and Bolivia, but Sr. Campos in neighboring Brazil, and Tony in the United States.

**VI .- Manner of Gesturing:** Cassell (1999) suggests that we use our faces and hands as an integral part of our dialogue with others, no matter what our language, cultural background, or age may be, but identifies particular emblematic gestures that appear to constitute between ten and twenty percent of the everyday gestures produced by speakers engaged in conversation as solely culturally defined, and imbued with meaning. Certain cultures have been shown to exhibit a greater number of these emblematic gestures in their communicative repertoire - such as French and Italian - than others, with Italians speakers often substituting emblematic gestures for speech. Moreover, members of certain cultures exhibit greater quantity of gestures per utterance than others, with British nationals often qualifying for the least number of gestures used in conversations (Cassell, 2000).

While some gestures only acquire meaning within certain community-based conventions, identical gestures often have quite different semantic content among different societies. In particular, assent and dissent gestures should be carefully monitored: for example, what Americans understand as the symbols for "ok" with the thumb and forefinger forming a circle and the remaining fingers extended, is insulting for cultures as diverse as Brazilians, Russians, and Germans, commonly used to refer to money in Japan, and to refer to worthless - zero value - items in France . Even a simple head nod can be interpreted as formal assent, as mere confirmation of the speaker's turn-taking, or even as a formal negative.

Cassell also recognizes cultural variability among those gestures intended to represent a common metaphor. In particular, conduit metaphoric gestures, which depict abstract ideas as bounded containers that can be held and passed between conversation partners, have been shown to vary dramatically across cultures, and are even absent in certain language communities' narrations, such as Chinese and Swahili.

Even as gestures are integral to, and support spoken dialog, they are also imbued with culturally specific meaning when de-coupled from the active speech acts. Feyereisen and De Lannoy (1991) argue for a culturally-specific "technique of the body," believing that as each person learns the dialect and language of the group that s/he belongs to, they reproduce the gestures, face movements and corporal expression typical of that group. From the directness and length of eye contact, to gestures and postures asynchronous with speech, all are embedded with cultural cues and conventions: Japanese and Koreans

often interpret a direct, sustained gaze as insulting or even overtly sexual, whereas in the United States averting the gaze is often interpreted as dishonest behavior, a weakness, or an expression of extreme shyness at best. Similarly, addressing visitors from a standing position may express respect in certain settings, it can also express undesirability towards the interactor, as can addressing the interactors from a sitting position.

**VII.- Emotional Dynamics:** Animate characters' emotional model should impact their behavior, and in turn be affected by the interactor's comments and actions. A sentence with identical semantic and syntactic content will be performed much differently - graphically or through a text-based description - depending on the character's emotional state at the time. Emotional dynamics affect what gets said, how it is said, and the reactions of the character in light of the interactor's utterances.

The appropriateness, frequency, degree of emotional outbursts (such as crying, yelling, seething), amount of stimuli required for the outburst to reach its performance threshold, and length of time an emotional state lasts, as well as the degree of comfort with direct confrontations, vary across cultures. However, beyond how they are expressed, whether all our emotions - barring the startle and innate affinity/disgust reactions - are socially constructed and learned, or innate, remains an open research question with important implications for the field of multi-cultural character design.

Recent research by Picard (1998) holds the promise of monitoring the interactor's physiological emotional state unobtrusively in the near future, thus allowing the characters to adapt their roles and behaviors in response or in preparation to some universal interactor's moods. Yet knowing the interactor's emotional states still leaves the questions of how to appropriately interpret and then respond to these moods and emotions open for the character designers, as the character's response to the interactor's emotions will, in turn, be interpreted through the interactor's expectations of socially acceptable behavior. The muted emotional response of an Asian character may not be perceived as empathic by the Italian interactor, in fact, it may be completely misunderstood as indifference.

What dimensions of emotions each character should have; what emotional states should be specifically accounted for, and populated with multiple behaviors within the emotional dimension coordinate space; as well as how these emotions should be represented and performed by the character, depends largely on the emotional theoretical framework chosen by the character designer. As Brave and Nass summarize (in press), evolutionary theorists argue for innate emotions evolved to address a specific environmental concern of our ancestors, while emotion theorists claim that the role of higher cortical processes in differentiating emotions points towards emotions' constructed origins, such that any cross-culture consistency would be the result of similarities across social structures, rather than biologically grounded.

Between these extremes is often called "basic emotions" theory, which draws upon primate and cross-cultural studies to argue that emotions such as fear, anger, sadness, joy, disgust, and perhaps even surprise and interest, are shared and recognized

by all humans (for example, see Ewen, 1988). While they may be perceived to be of differential intensity, the basic emotions theory allows us to craft certain believable behaviors in our characters that may be recognized across the world within those six basic emotions, in contrast to the culture-specific dimension space that the emotion theorists claim, and to the absence of the need to consider emotional dimensions' variability across cultures that evolutionists claim.

As for our case study, all our Kyras share two main mood dimensions: an emotional one ranging from happy to sad, and a physiological dimension ranging from peppy to tired. The Venezuelan Kirita and the Brazilian Kira, however, in keeping with their Latin American temperament, have a social dimension ranging from friendly to shy, which allows them to respond to the interactor's flirtatious or insulting comments quite dramatically and to populate the space suggested by the "basic emotions" theorists. However, the three Kyras differ drastically in the period of time until every mood regresses to a neutral state, with the Venezuelan Kirita maintaining every emotional charge the longest between the three, as well as the extent to which they express these emotions, with the American Kyra showing the most dramatic displays of anger.

**VIII.- Social Interaction Patterns:** perhaps even more importantly than what is said, how it is pronounced, and how gestures support the utterance, is the knowledge and "tact" of when and how to bring up certain topics, which varies dramatically across cultures. When to bring up business issues within an interaction - even if it is constrained to providing information to a web-visitor - as well as when to knowingly breach the familiarity barrier within a multiple-visit relationship, are examples of culturally variable time periods that characters must respect.

Disclosure tends to correlate with increasing familiarity, yet the timing of the request for information can bring an otherwise enjoyable conversation to a dead halt. For example, personal questions and information about family are always off-limits for many Arab and Asian cultures, in particular those regarding the females within the family, yet they are commonplace, in fact, often expected even among casual acquaintances in American and Western cultures. The Extempo character Jennifer Jones, a female spokesperson for a fictional car company, often chats with her visitors about her husband and child, and asks similar information from the visitors, as this interaction exchange pattern is quite common amongst American women, her target audience (for transcripts of Jennifer Jones' interactions, see Hayes-Roth and Doyle, 1998).

Our present technological limitations force us, as designers of interactive characters, to confront the reality that our characters may make mistakes more often than not, either understanding or responding adequately to their interactor's utterances. How the characters recuperate from these blunders, whether and how often they acknowledge a lack of understanding, and whether they apologize for it are highly dependent upon each culture's perception of mistakes and appropriateness of continued apologies. Characters from individualistic cultures may therefore believably use a defensive non-apologetic "Hey, I don't know everything yet, do you?" when the interactor's utterance cannot be matched to the character's backend. Characters from collectivist cultures, on

the other hand, would tend to acknowledge the blame, and apologize, perhaps even using contextual cues to shift the focus away from individualistic performance, as this has been suggested to lead to greater empathy within collective culture members (Miller, Kozu, and Davis, 2001), such as "Sorry - what was that? If it is not too much trouble, please speak to me in complete sentences. Let's try that again."

Other important culturally variable social interaction patterns character designers should explicitly address are how frequently the character should take the initiative in the conversation, the appropriateness of interruptions, the pace of the turn-taking conversation, how the interactor's comments are acknowledged, and the frequency with which questions can be exchanged, among others. Our Kyras are particularly different in terms of the social interaction patterns they exhibit. American Kyra speaks with authority and urgency, turning every lesson into an exciting battle plan, and although she is quick to encourage, she is not afraid to reprimand visitors. Venezuelan Kirita is slightly more soft-spoken, but more flirtatious and curious than her American counterpart about the interactor's previous knowledge on her lessons, and on current topics outside her role. Brazilian Kira is very polite, assuming a more relaxed pace for the lesson and evaluation, rarely asks questions, and refuses to speak teenage lingo- though she understands it quite well.

**IX.- Role and Role Dynamics:** Each character is crafted with a role in mind, be it to advise, to entertain, to educate, to guide, among others. In all of these applications, interacting with an animate character should provide a uniquely immersive and human experience, as much like reading a book or watching a film as it is like using a computer. As character designers, we have a responsibility in employing animate characters to ensure that the roles our characters are assigned to match each of the character's eight other characteristics to the best of our abilities, within the usual technical constraints, as we run the risk of alienating annoyed users from interacting with any character after an unsatisfying exchange. For example, a talkative character with slow loading animations will not contribute to the user's experience in a efficiency-driven application, and may perhaps serve its advice purpose better through a text-based, emotionally muted response Doyle (1999) explores the issue of where communicative characters may best showcase their abilities, and points out that large-scale user testing with character tutors have shown that the mere presence of the character makes children more attentive and may lead to improved retention of the subject matter covered (Lester, 1997). Besides constraining the character's behaviors based on their role, we should also consider the constraints each role places upon the character, and the communication patterns each role entails.

Janet Murray defines believability as directly linked to our familiarity with the interaction pattern portrayed and encouraged by the character, while articulating character-design lessons from the success of Weizembaum's computer program Eliza. "Most people immediately know how to interact with [Eliza]. The psychiatric interview is a known pattern that people bring to the interaction." (Murray, 1994). Each role therefore also carries with it a set of culturally defined patterns of interaction that direct the exchange between the users and the character, and contribute to maintaining the

deferment of questioning. Kyra's role is that of a teacher, or tutor, with the explicit goal of interesting young teenagers in art history and art appreciation.

The role of teaching young children may be perceived as offering little cultural variation, as our species' survival depends on the success of this cross generational, one-on-one, affectively high teaching, in a pattern that has existed for longer than the psychological interview pattern Murray considers so well known. Yet even as we keep the tutoring role constant, teaching practices across cultures vary dramatically from each other, even within the highly isomorphic national educational systems. Our Kyras predictably differed significantly between them in their role dynamics. While American Kyra treated all interactors as playmates, occasionally teasing and cajoling the right answers from them ("Don't worry mortal, I won't use my powers against you if you choose wrongly!"), Brazilian Kyra encourages her students from a respectful distance ("Nao se preocupe se voce nao tem certeza de qual eh a pintura certa. Voce esta aqui para aprender." -- that is, "Don't worry if you are not sure of which painting is the right one. You are here to learn"). Meanwhile, Venezuelan Kirita reassures her students by explaining what the goal of the assessment is ("Si no te la sabes, dímelo y asi yo se por donde tenemos que empezar hoy la lección." -- translating, "If you don't know the answer, tell me so that I know where we should be starting the lesson today.").

Of particular interest as the first study to document such variation is the recently released video comparison on the teaching practices for mathematics on 231 eight grade classrooms during the 1995 school year, between Japan, Germany, and the United States, as part of the Third International Mathematics and Science Study, by the U.S. Department of Education (Stigler et al, 1999). Not only are each educational systems requirements, teaching level, and lesson plans distinct, but even without these constraints, given free reign in their classrooms teachers differed dramatically across national boundaries in terms of their pedagogical practices and goals, with surprising consistency within each national boundary. Teachers in Germany and the U.S. emphasized teaching math skills, whereas Japanese teachers emphasized thinking, and accordingly organized their lessons to begin with a problem solving session first, before revealing the lesson concepts. Teachers in Germany and the U.S., in contrast, began each lesson with a concept acquisition phase and ended with a practice - or application - phase. German and American students, as a result, spent the majority of their working time in class practicing routine procedures, while their Japanese peers spent the majority of their time problem solving. Moreover, American teachers asked more yes/no questions than their German and Japanese counterparts, who tended to ask mostly explanation or description questions. Delivery of mathematical content also differed across countries, with only one fifth of the topics presented in the U.S. lessons developed, in contrast to more than three-fourths of the topics presented in German and Japanese classrooms.

#### **IV.- RESEARCH DIRECTIONS:**

Some of our group's previous work at Stanford began exploring the use of characters as facilitators of second language learning, and cross-cultural communication through the child's emotional engagement with the characters, given the additional cultural context that rich animated characters can provide. Tigrito (Maldonado, Picard, Hayes-Roth,



1998a, Maldonado, Picard, Doyle, Hayes-Roth 1998b), embodied as videoclips of a plush tiger cub toy on screen, allowed children to direct the interactions and spoken utterances of their avatar to plush cubs from different cultures, leveraging the socio-linguistic context that has been deemed so critical to successful practices of second language instruction in schools across the world (Pufahl, Rhodes, Christian, 2001).

In Tigrito, each child directed his/her cub by pressing the action-description buttons below their cub, or at a higher level, by changing the mood slides for their cub. Each action in turn, was performed and interpreted differently by each cub, based on their moods and cultural background. The directed action would then be performed in a distinct believable manner - in terms of each cubs' emotions, verbal expressions and gestures. Children could not only interacted through their cub avatar with the other cubs controlled by other children, or autonomously driven by the engine.



**Image 2: Tigrito at play: Interaction of an Avatar with an Autonomous Character**

Exploring the premise that the facial expressions of the six basic emotions - anger, fear, sadness, surprise, happiness/enjoyment, and disgust - are recognized across cultures, although cultural variations exist in the perceived intensity with which each emotion is felt (Ewen, 1988), another of our projects, the Funki Buniz Playground (Maldonado and Picard, 1999), encouraged cross-cultural play between children of varied cultural backgrounds, focusing the interaction exclusively on the developing affective relationships -- both in the virtual world, between the characters, and in the real-world, between the children. By rendering the affective responses in the avatar's facial expressions and eliminating the linguistic content in action choosing and execution, as well as by providing a dynamic and content-filled environment for the avatars, we aimed to engage five to seven year olds who shared limited dominion of a common language in open-ended collaborative play, in the hopes that through this experience their understanding their cultural differences of would increase -- and maybe even be bridged.

Extempo's Learning Guides allow us to carry this rich educational opportunity to a higher degree, from the button-based exchange in Tigrato to free form text interaction with culturally-specific characters, who can combine the best one-on-one pedagogical practices with the rich socio-cultural context and emotional motivation that animate characters provide. Therefore, we have begun designing language tutors that leverage these qualities to both facilitate interaction between language learners, and with their animate tutor. One avenue of such an exchange that we are presently exploring involves a community of animate tutors, referring learners to each other based on the specific needs, proficiencies, learning style preference, and interests of each learner. Learning guides hold the potential for surpassing human mentors in their ability to monitor individual learners closely, and to continuously adapt their assistance to the dynamic needs of individual learners. Large scale deployment of our three Kyras will determine the underlying models and character qualities that should be emphasized within the perspective of second-language learning, and we look forward to presenting these forthcoming experiments to you in the very near future.

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