A Study on Cultural Variations of Smile
Based on Empirical Recordings of Chinese and Swedish First Encounters

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ABSTRACT

In this study, smiles[1] were investigated in eight Chinese and Swedish video-recordings of first encounters. The purpose was to explore features of smile, culture specific as well as those that are common to Chinese and Swedes. We found that the Swedish participants smiled more than the Chinese, and that the Chinese female participants smiled more than the Chinese male participants. Only the Chinese smiled with their gaze turning towards the interlocutor/sideways/around or with eyebrow raise expressing embarrassment or disagreement, while only the Swedies smiled with up-nod(s) or chuckle/laughter expressing surprise, sympathy or politeness. Chinese has *'en'*, *'e'*, *'a'* and *'dui'* as the most common vocal-verbal expressions accompanying smile and Swedish has *'{j}a'*, *'okej'*, *'{j}a jo'*, *'{j}a {j}a'*, *'hja'*, and *'{j}a okej'*. [2] The Chinese participants used smile in the context of turn giving and feedback+turn giving more than the Swedish participants.

Categories and Subject Descriptors

H5, J4

General Terms

Design, , Human Factors, Languages

Keywords

Smile, cultural variation, gender, virtual human interaction, Chinese, Swedish, first encounters

1. INTRODUCTION

Smiles are common facial expressions that play an important role in human communication. For instance, they communicate considerable emotional and attitudinal information, influence the interaction flow, and facilitate friendly communication. However, research on culturally adapted virtual agents requires more empirical studies of human-human interaction to become realistic. This paper attempts to investigate smiles in video-recordings in four Chinese-Chinese and four Swedish-Swedish first encounter dialogs between university students, in order to investigate how and why people smile to strangers in human interactions.

2. PURPOSE

The paper primarily addresses three questions. First, what features can be found, concerning how and why people smile to strangers in human communications? Second, what is the cultural variation between Chinese and Swedes? Third, what gender variation can be found?

3. MATERIALS AND METHOD

The study is based on four Chinese-Chinese and four Swedish-Swedish video-recordings of face-to-face dyadic dialogs between university students studying in Sweden. In order to make a tentative comparative study of smiles with respect to differences in culture and gender, each subject was studied in two mono-cultural dialogs, one with an interlocutor of the same gender and one with an interlocutor of the other gender. For instance, Chinese female Cf2 was communicating with a Chinese female Cf1 in dialog 1 and a Chinese male Cm1 in dialog 2. The languages used were Chinese and Swedish.

The analysis of the recordings focuses on how two strangers go about the task of getting to know each other. Each interaction was video-filmed by three video cameras (left-, center-, and right-position) with interlocutors face to face in a standing position. Each video-recording lasted approximately seven to ten minutes, and the first seven minutes were analyzed in detail in this study. The video-recorded data was transcribed and checked according to the GTS (Göteborg Transcription Standard) version 6.2 (Nivre, 1999). They were then manually annotated according to the MUMIN multimodal coding scheme for feedback (Allwood, Cerrato, Dybjær, Jokinen, Navaretta & Paggio, 2005; Allwood, Cerrato, Navarretta & Paggio, 2006). To ensure intercoder reliability, a sample of 100 instances of smiles was first coded

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[1] Smile in this study is distinct from laughter, chuckle, and giggle.

[2] { } contains letters of the written word form that were not pronounced in the spoken form

jointly by one Chinese and two Swedish coders, in order to determine joint principles. The Chinese corpus was coded by two independent Chinese coders, and the Swedish corpus by two independent Swedish coders. After this, two coders for each language cross checked the codings and then agreed on a joint coding for all discrepancies. The inter-rater reliability was 95%.

4. ANALYSIS AND RESULTS

In this section, the frequency of smiles with and without vocal-verbal or gestural accompaniment is analyzed as well as the emotional/attitudinal and interactive communication management (ICM) functions of smiles .

4.1 Smile only versus smile with accompaniment

In the data, smiles are used with and without verbal-vocal or other gestural accompaniment. "Smiles with accompaniment" refers to smiles which by the same person are produced together with another vocal-verbal or gestural expression, which overlaps totally or partially with the smile or occurs immediately before or after the smile. In total, the Swedish subjects smiled considerably more than the Chinese subjects. The Chinese females smiled somewhat more than the Chinese males, while Swedish males and females smiled with approximately the same frequency (see Table 1).

Table 1: Chinese and Swedish female and male differences in using smile

Culture	Gen-der	Smile only	Smile with verbal-vocal or other gestural accompani-ment	Total
Chinese	F	4	40	44
	M	5	29	34
	Tot	9	69	78
Swedish	F	13	42	55
	M	13	41	54
	Tot	26	83	109
Total		35	152	187

Chinese female and male subjects smiled without other accompanying sound or gesture with roughly the same frequency, whereas, Chinese females smiled more with accompaniment that Chinese males. Swedish females and males smiled both with or without accompaniment with about the same frequency.

4.1.1 Vocal-verbal accompaniment of smile
Chinese and Swedes have different vocal-verbal expressions accompanying smiles.

Table 2: The most common vocal-verbal accompaniment for smile (with a frequency of more than 1)

Chinese vocal-verbal Accompaniment/ 'English correspondence'	Chinese		
en 'yes/ ok'	4	1	5
e 'oh/m'	1	4	5
a 'oh/ah'	3	1	4
dui 'yes/right'	2	1	3
Swedish vocal-verbal accompaniment/ 'English correspondence'	Swedish		
{j}a 'yeah'	5	6	11
okej 'ok'	4	1	5
ja 'yes'	2	3	5
hej 'hi'	3	1	4
{j}a elle{r} hu{r} 'yeah don't you agree'	0	4	5
{j}a jo 'yeah i agree'	3	0	3
{j}a ha: 'yeah okay:'	2	0	2
{j}a {j}a 'yeah yeah'	2	0	2
hja (ingressive) 'yeah'	1	1	2
ja okej {j}a 'yes ok yeah'	2	0	2
m 'm/yeah'	1	1	2
{j}a okej 'yeah ok'	1	1	2

The most common Chinese vocal-verbal expressions in this study were 'en' and 'dui' and the most common Swedish ones were '{j}a', 'okej', 'ja', 'hej', '{j}a elle{r} hu{r}', '{j}a jo', '{j}a ha:', '{j}a {j}a', 'hja', 'ja okej {j}a', 'm', and '{j}a okej'. Chinese females used 'en', 'a' and 'dui' with smile more than males, and Chinese males used 'e' more than females. In the same way, Swedish females preferred to use 'okej', 'hej', '{j}a jo', '{j}a ha:', '{j}a {j}a', and 'ja okej {j}a' with smile, but Swedish males preferred '{j}a', 'ja', and '{j}a elle{r} hu{r}'.

4.1.2 Gestural accompaniment of smile

Chinese and Swedish interactions seem to have some differences in what accompanies smiles most often (see Table 2). The Chinese female participants smiled most often with repeated down-nods, whereas, the Swedish participants smiled most often with a single down-nod. Only the Chinese smiled with complex head movements, gaze turning towards the interlocutor, gaze sideways, gaze around and eyebrow raise (see Excerpt 1), while only Swedes smiled with up-nod, up-nods, gaze down, chuckle and laughter. Hand movements were used with smiles by both the Chinese and the Swedish participants.

Table 3: The most common gestures accompanying smile (with a frequency of more than 1 for the 'Total')

Accompa-nied Gestures	Chinese			Swedish			Tot
	F	M	Tot	F	M	Tot	
Down-nod	2	0	2	3	4	7	9
Down-nods	8	0	8	2	2	4	12
Head complex	1	1	2	0	0	0	2
Gaze turning towards IL	0	3	3	0	0	0	3
Gaze sideways	0	3	3	0	0	0	3
Gaze around	0	2	2	0	0	0	2
Hands	1	2	3	2	2	4	7
Eyebrow rise	1	1	2	0	0	0	2
Up-nod	0	0	0	1	1	2	2
Up-nods	0	0	0	2	0	2	2
Gaze down	0	0	0	1	1	2	2
Chuckle	0	0	0	3	1	4	4
Laughter	0	0	0	1	1	2	2
Total	13	12	25	15	12	27	52

Excerpt 1. Smile with eyebrow raise

Chinese

Cm2: xiao yun dong yi xia

small exercise

Cf1: < xiao yun dong >

<*small exercise*>

< VFBE; CPUE/A uncertainty >,

< GFBE **eyebrow raise**; CPUE/A

uncertainty R >,

< GFB **smile**; CPUE/A friendliness >[3]

Excerpt 2. Smile with up-nod

Swedish

Sm2: ... uppe: i förort ja område fyra där

uppe vid [e] parkeringen där

... up: there in the suburb yeah area

four there up at [eh] the parking lot

there

Sf1: [ja]

[yes]

Sf1: <1 okej >1 där har jag åkt

skri{d}sko{r} många gånger <2 | >2

<1 okay >1 i've skated there many

times <2 | >2

<1 VFB; CPU >1, <1 general face: **smile** >1,

<1 GFB head: **up-nods**; CPU >1

<2 general face: giggle >2

4.2 Emotional and attitudinal functions of smile

There are many underlying emotional and attitudinal functions of smile coded in the target data. By means of smiling, Chinese subjects expressed emotions and attitudes of friendliness (with a frequency of 32), embarrassment (11), friendliness+interest (7), friendliness+agreement (4), and friendliness+uncertainty (3). The Swedish subjects, on the other hand, most often expressed friendliness (with a frequency of 50), amusement (15), agreement (7), friendliness+surprise (3), friendliness+uncertainty (3), sympathy (3), and politeness (2).

Excerpt 3. Smile for embarrassment

Chinese

Cm2: a en: technology ma

ah ok: is it technology

Cf1: <1 bu shi >1 <2 wo shi ben ke >2

<1 no >1 <2 i'm bachelor >2

<1 VFB; CPU disconfirmation >1

<2 VFB; CPUE/A certainty >2,

<2 GFB general face: **smile**; CPUE/A

embarrassment O >2

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[3] V=vocal-verbal. G=gestural, FB=feedback, FBE=feedback elicitation,

CPUE/A=contact, perception, understanding, elicitation/acceptance.

Excerpt 4. Smile for politeness

Swedish
Sm1: ... {j}a / hon / skicka{de} mejl till //
flera i klassen tro{r} ja{g} // men så
// <1 så ku{n}de ja{g} >1 <2	>2 <3
// de{t} e0 ju inte så hårt jobb så >7
... yeah / she / sent mail to // several
in the class i think // but so // <1 so i
*could 1 <2	>2 <3 // it's not really*
a very hard job so >3

<1 general face: **smile** >1, <1 quick >1

<2 general face: chuckle >2

<3 GFB general face: S **smile**; CP-UE/A

politeness >3

The most common emotions and attitudes expressed by smile were friendliness, amusement, friendliness+uncertainty and agreement for both Chinese and Swedish participants. However, smiles expressing friendliness+disagreement, friendliness +embarrassment and embarrassment were only used by the Chinese (see excerpt 3 above). Friendliness+surprise, sympathy and politeness were only used by the Swedes (see excerpt 4 above).

4.3 Interactive Communication Management (ICM) functions of smile

Smile also plays a role in interactive communication management (ICM), which includes feedback, turn giving, and feedback+turn giving (see Excerpt 5, 6 and 7).

Excerpt 5. Smile as turn giving

Chinese
Cm2: < zhe ge biao qing shen me yi si a >
< what do you mean by this facial
expression >

< **smile**; **turn giving** by posing a question **uncertainty/friendliness** >

Excerpt 6. Smile as feedback+turn giving

Chinese
Cf1: wen zhang de wen ///
wen as in the word of wen zhang ///
Cm2: < oh sorry /// >
< oh sorry /// >

< VFBE; CPUE/A uncertainty >,

< GFBE **smile**; **feedback and turn giving**

CPUE/A **embarrassment** >, < GFBE gaze: around;

CPUE/A uncertainty/hesitation

Excerpt 7. Smile as feedback

Swedish
Sm1: ... så tackar dom nej efte{r} fyra veckor efte{r}
vi ha{r} väntat fyra veckor < på svar så
tacka{r} dom nej > / då bli{r} de{t} så hä{r}
/ ah
… so then they said no after four weeks after we
had waited four weeks < on a response they
said no > / then it will be like this / ah

<VFB exhalation sound: Sf2;

CPUE/A sympathy >,

< GFB **feedback** general face:

Sf2 **smile**; CPUE/A **sympathy** >

Table 3 includes the number of occurrences for smiles in interactive communication management. There are 69 smiles not functioning as ICM, and 118 as feedback, turn giving, and feedback+turn giving. Both Chinese and Swedish used smile most often as feedback. The Swedes used more smiles with ICM functions totally than the Chinese, in total and specifically for feedback, while the Chinese used more smiles for turn giving and feedback+turn giving. (As we have seen above, the Swedish participants also smiled considerably more in general.)

Table 4: Interactive communication management and smile

ICM function	Chinese			Swedish		
	F	M	Tot	F	M	Tot
feedback	26	18	44	33	20	53
turn giving	6	3	9	1	2	3
feedback +turn giving	4	4	8	1	0	1
no ICM function	8	9	17	19	33	52
Total	44	34	78	54	55	109

5. DISCUSSION AND CONCLUSIONS

In this study, the Swedish participants smiled more than the Chinese participants. Among the Chinese, the female participants smiled more than the male, while there was no gender difference in the Swedish data. These preliminary findings need to be confirmed in a larger study, but still suggest that there might be a cultural difference in how smiles are used in first encounters in Sweden and China. The gender difference in the Chinese data

might also suggest that there are more gender differences in the use of smiles in China than in Sweden.

Both the Chinese and Swedish participants smiled most often with accompanying down-nod or down-nods and with hand movement. This suggests that the gestural accompaniments of smiles have some similarities, at least between Chinese and Swedes. However, there were also some differences in gestures occurring with smiles. For instance, the Chinese participants smiled with complex head movement, gaze turning towards the interlocutor, gaze sideways, gaze around and eyebrow raise, while this did not occur at all in the Swedish data. The Swedes, on the other hand, smiled with single up-nod, repeated up-nods, gaze down, chuckle and laughter, something which the Chinese did not do at all. This suggests that the gestural accompaniment of smiles does have some cultural variation. Besides the cultural variations, there were also some gender differences. Chinese females smiled more often with single down-nod and down-nods, while Chinese males smiled more with gaze turning towards the interlocutor, gaze around, and gaze sideways. The Swedish subjects did not show any big gender differences, but Swedish males smiled somewhat more with single down-nod. while Swedish females smiled slightly more with repeated up-nods. This suggests that the gestural accompaniment for smile might also have gender variations within the same culture and that these differences might vary in extent between cultures.

Many of the vocal-verbal expressions accompanying smiles were feedback words and smiles are therefore important for interactive communication management (ICM). Among the ICM functions, both the Chinese and the Swedish participants smiled most often to give feedback, then as turn giving, and sometimes as feedback+turn giving, among the ICM functions. A cultural difference was that the Swedish participants used more smiles as feedback, while the Chinese participants used smiles more for turn giving and feedback+turn giving. Only the Chinese participants expressed embarrassment, friendliness+ embarrassment, and friendliness+disagreement by means of smile, often with the purpose to avoid losing face or having a conflict, i.e. they intended not to continue speaking or hold the floor but to give the turn to the other interlocutor by smiling (sometimes with some accompaniment). Only Swedish participants expressed friendliness+surprise, sympathy, and politeness by smiles. Apart from these differences, we find that both the Chinese and the

Swedish participants expressed emotions and attitudes of friendliness, amusement, friendliness+uncertainty, and agreement by smiling.

The study has some limitations, since the number of subjects is small. The comparative results may be too heavily influenced by individual participants and also activity dependent, consisting only of first encounter dialogs. The participants were Chinese overseas and Swedish native university students, so it is unclear how far this preliminary study can be regarded as representing the Chinese or Swedish features of smile in general. The preliminary results and conclusions, therefore, need to be substantiated by a more extensive study. The study does, however, suggest some hypotheses to be studied further. Since the materials are quite limited in size and activity variation, further research is needed to attempt generalizations about cultural differences. This pilot study can only contribute to a general description of how and why people smile in human communication. This description could be made use of, for example, in virtual human interaction and in personal communication training.

With respect to virtual human interaction, the study suggests that there is some culturally determined variation in how smiles are used and variations of this type provide input for "parameter setting" of embodied communicative agents for use in different cultures.

6. ACKNOWLEDGMENTS

7. REFERENCES

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