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# **The Impact of Cultural Assumptions about Language on Collaboration in Global Virtual Project Networks**

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## THE IMPACT OF CULTURAL ASSUMPTIONS ABOUT LANGUAGE ON COLLABORATION IN GLOBAL VIRTUAL PROJECT NETWORKS

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### ABSTRACT

The globalization of the architecture, engineering and construction industry has led to more work executed in Global Virtual Project Networks (GVPNs). The challenges to network performance due to the cultural and linguistic diversity that characterizes these networks has been well-documented. However, the interface between language and culture and its role in network interactions is not well understood. Our research seeks to explore this interface by examining how cultural assumptions about language can impact collaboration in GVPNs. Based on a mixed-method, grounded-theory approach, we investigate how the informal linguistic style of individuals within the network lead to negative evaluations, which in turn serve to marginalize those individuals who adopt this style. Our results demonstrate that linguistic diversity can negatively impact network cohesion because of the different cultural assumptions that individuals ascribe to linguistic styles.

**KEYWORDS:** collaboration, cultural differences, global virtual project networks, interactional dynamics, linguistic diversity

### INTRODUCTION

Because the architecture, engineering and construction (AEC) industry is globalizing (Colella et al. 2012), geographically distributed workers from a variety of language backgrounds are interacting through technological mediation (Maznevski and Chudoba 2000) to execute complex design and planning work in Global Virtual Project Networks (GVPNs). GVPNs are globally distributed “teams of teams” who interact through technology to execute project work. Within the GVPN structure, teams work independently on certain project components and then are required to effectively integrate these components with components developed by other teams. Because the teams are globally distributed, GVPNs are characterized by their cultural and linguistic diversity, and challenges to network performance often result from this diversity.

Previous research has examined the role of cultural and linguistic diversity on virtual teamwork and often demonstrates that both types of diversity negatively impact network performance (Shachaf 2008; Adler and Gunderson 2007; Massey et al. 2001). However, research has also demonstrated that performance can be improved over time (Comu et al. 2010), thus improving a network’s ability to leverage the positive aspects of diversity such as creative problem solving (Lattimer 1998). Although linguistic diversity is closely related to cultural diversity as “the two are intricately interwoven so that one cannot separate the two without losing the significance of either language or culture” (Brown 1994, p. 165), research has typically focused on how cultural differences impact network performance utilizing abstract, cultural classification systems (e.g. Hofstede 2001) that do not account for the role that language plays in reflecting culture. Because cultural difference is often realized through language, by

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focusing research on linguistic practice (Eckert 2006)—the relationship between linguistic form and social meaning—we are able to more directly and concretely understand the impact of cultural difference on interaction in GVPNs.

Within any given language, meaning can be conveyed in multiple ways as individuals must make choices about how to most appropriately convey an intended meaning. These language choices are conditioned by a variety of factors including assumptions about the interactional setting such as knowledge of the audience (Bell 1984) and of the communication norms associated with the event (Gumperz and Cook-Gumperz 1982). Language choice is also conditioned by cultural assumptions. For instance, in the American South, addressing an older male with the honorific *sir* indicates respect. In the Northeast, use of the same honorific is often interpreted as disrespectful, as it serves to create social distance between the two individuals by highlighting differences in age. Note that these two conflicting cultural assumptions are associated with regions within a particular country, which highlights the problem of generalizing cultural and linguistic practices to nations as a whole, as is often the approach taken in previous research (e.g. Hofstede 2001). The research on the relationship between language and culture typically focuses on an individual's nationality, their native language, and Hofstedian cultural categories (e.g. Hofstede 2001) without exploring the ways that cultural assumptions are encoded through language. Thus, unlike simple differences in word-object correspondences (e.g. *elevator* in the U.S. vs. *lift* in the U.K.) that are due to native language (or dialect) differences, the example of honorific usage above in different regions of the U.S. clearly demonstrates the link between language choice and culture, which we argue has the potential to better explain the interactional dynamics of GVPNs when compared to discrete analyses of language and culture.

Given the high rates of conflict (Hinds and Mortensen 2005) and the difficulty in establishing trust in many global teams (Jarvenpaa and Leidner 1999), it is unclear how language and culture interface with each other to shape the interactional dynamics of GVPNs. Thus, our goal in this paper is to explore how cultural assumptions about language impact collaboration in GVPNs.

## **CULTURAL ASSUMPTIONS ABOUT LANGUAGE**

Language is often framed as an important contributor to culture. However, language is also a cultural product, as linguistic choices are conditioned by cultural practice. Because language influences thinking, expectations and interactional behavior (Evaristo 2003), it follows that culture also influences linguistic behavior. Staples and Zhao (2006, p. 391) describe an individual's cultural background as composed of both surface-level and deep-level characteristics. Surface level characteristics include race, ethnic background, and native language. Deep-level characteristics include cultural values. However, this framework views the two levels as exclusive and does not account for the role that culture plays in shaping linguistic practice. For instance, cultural assumptions about linguistic practice are often made salient in the attitudes or ideologies that individuals have about language. Labov (1972) noted that individuals who spoke with a local New York City dialect were judged to be less well educated and of lower social class compared to individuals who spoke with a more neutral accent. Similarly, Luhman (1990) notes that speakers of Appalachian English (a dialect of American English spoken by mountain communities in the rural Southeast) were judged by individuals outside of this community to be less well educated but friendly, trustworthy, and honest. Kankanhalli et al. (2007, p. 258) found that global virtual project teams evaluated the fluency of their teammates

and associated these evaluations with the quality of their work output, which is evidenced in the following interview excerpt: “For the presentation, the French members had a problem with speaking English fluently. So we were doubtful whether they would be able to present properly”. In a project management context, Lee-Kelley and Sankey (2008, p. 58) found that the linguistic choices by Asian managers signaled by use of *we*<sup>3</sup> reflected their team-based approach to work, while Western managers choice of *I* reflected their more individualistic approach to the task outcomes in statements about their satisfaction with the project execution such as “we felt very happy, proud” versus “I enjoyed working on these projects”. These examples demonstrate that individuals judge others based on their language use and that regional, national and cultural communities align themselves around shared linguistic practice.

Similarly, cultural assumptions about language shape individuals’ evaluations of and ideologies about writing as well as speech. In writing, the language choices typically involve selection of a standard or non-standard alternative (Sebba 2003). Androutsopoulos (2000, p. 528) notes that the choice to use non-standard written language can be viewed as “transgressive”. Sebba’s (1998) research on British Creole writers in Jamaica demonstrates that their use of <yu><sup>4</sup> for *you* is a language choice that distinguishes writing by native Jamaicans from the literacy norms English’s British origins. From a cultural standpoint, these stylistic choices also distance Jamaicans from their colonial relationship with England. More than a decade later, Hinrichs (2012) demonstrates that the same choices are meaningful in computer-mediated writing contexts. Thus, non-standard spelling choices can reflect a community’s cultural practices. Even in cases where written language choices are not associated with regional ways of speaking (as in the case of British Creole or Southern American English), Iorio (2007) demonstrates that members of online communities hold strong language ideologies about the use of “netspeak” (Crystal 2001), e.g. the use of <u> to represent *you* and use of abbreviations such as <lol> to indicate *laugh out loud*. The use of netspeak or other types of informal writing, even in online communities, is central to the interactional dynamics of community members because non-standard writing can serve to distinguish one online community group from another (Iorio 2011; Iorio 2009). In GVPNs, informality in writing can create cultural faultlines (Polzer et al. 2006) between workers from different backgrounds. Lee-Kelley and Sankey (2008, p. 54) argue that “email’s informal and largely egalitarian appeal to Westerners is at odds with the eastern Confucian principle of respect for elders and seniors in the workplace”. This example highlights how cultural and linguistic practices are intertwined in global virtual project contexts and how language can be a mechanism through which cultural alignment (or misalignment) is enacted.

As this prior research has demonstrated for both speech and writing, individuals hold powerful ideologies that shape their cultural assumptions about language. In GVPNs, the impact of different cultural assumptions about the appropriateness of language choices are enhanced, as individuals from a variety of language backgrounds must communicate through a lingua franca or common language. In many GVPNs, English is the lingua franca (Dubé and Paré 2001). Although network members may be fluent in the grammar and vocabulary of English, this does not mean that they are fluent with English pragmatics, or the appropriate usage of the language within a sociocultural context (Leech and Leech 1983). Thus, workers from a variety of different linguistic backgrounds may be uncertain about how to communicate meaning through English in an appropriate, culturally situated way. To complicate the problem, individuals could read one of

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<sup>3</sup> Italics indicate a word taken outside of the sentential context, typically reflecting the standard spelling.

<sup>4</sup> Angled brackets indicate the way a word is written, typically reflecting a non-standard spelling.

many guidebooks on the pragmatics of English, e.g. in the U.S. or Australia, but, because virtual workspaces are not bound by any specific set of sociocultural norms, appropriate linguistic practices must emerge dynamically through interaction and negotiation (Locher and Watts 2008). When not familiar with the culture surrounding the lingua franca, individuals often make assumptions based on an extension of the norms from their own language and culture, which can lead to misunderstandings. The transfer of cultural assumptions across languages may be a driver for the interactional challenges of global virtual project work.

To investigate the role that cultural assumptions about language play in GVPNs, we posit the following research questions designed to first, identify whether cultural assumptions are made salient in GVPNs, and then to assess how any existing assumptions shape the interactional dynamics of the GVPN.

RQ1: Are cultural assumptions about language present in the interactions of global virtual project networks?

RQ2: If so, how do cultural assumptions about language impact collaboration?

## **METHOD**

In order to explore how cultural assumptions about language impact collaboration in GVPNs, we developed an experiment that was executed in Spring 2013 that was designed to approximate the interactional dynamics of global virtual AEC design and planning work. The experiment was based on two GVPNs composed of graduate students from universities in the U.S., the Netherlands and India who were executing 3D modeling, 4D modeling, scheduling, and cost estimating tasks associated with a building renovation project. The GVPNs were collectively responsible for developing an integrated and optimized design and construction plan. Audio and video recordings of the virtual collaborative design and planning sessions were imported into ELAN (Brugman and Russel 2004), a multi-media annotation software package. Based on the analytical method described in Iorio and Taylor (2014), the recordings were annotated with a focus on identifying the interactional patterns between the geographically distributed network members. Each network was composed of two graduate students from three distinct linguistic backgrounds and who were enrolled in construction design and planning courses at their respective universities.

Participants from the U.S. universities were native or near-native speakers of American English. The near-native English speaking student was born abroad, but immigrated to the U.S. during primary school. Participants from the Dutch university spoke Dutch as a native language and learned English as part of a compulsory curricular component of their secondary education. All of their graduate courses were taught in English. Participants from India spoke Hindi and/or Tamul natively, but started learning English, at the latest, during primary school. One Indian participant noted that he learned Tamul and English simultaneously as first languages. As in the Netherlands, English in India is the language of “education, administration, the mass media, science and technology” (Sahgal 1991, p. 299) and is often associated with an increase in social mobility. However, one key difference between the linguistic landscape in the Netherlands and in India is that for more than 200 years, English was the language of the British colonizers in India. Thus, for Indians, while English is perceived to be a language that can create social mobility, it is also associated with cultural assimilation and in some cases cultural oppression. To culturally separate Indian English from British English, many Indians prefer a more vernacular

form of English that is based on local norms, which serve to distinguish it from the native (British) English norms (Sahgal 1991). For the Dutch, these culturally assumptions about and associations to English are largely absent. Although the Americans also have a colonial relationship with British English and have developed local varieties of English, they grow up speaking English natively, which contrasts with the Indians. In the U.S., English pervades both social and professional domains, whereas in India, many social domains (e.g. price negotiation at a neighborhood market) are reserved for local languages (e.g. Hindi or Tamul), although this pattern is changing (Sahgal 1991). In sum, our research design combines participants from three distinct language groups with three distinct cultural relationships to English. This design maximizes the odds that we will be able to observe a variety of cultural assumptions about language and their implications on collaboration within the GVPNs.

The participants interacted asynchronously and synchronously through voice and text and did so extensively over the 9 week project duration. Teams met for up to two hours each week totaling approximately 18 hours of interaction that were available for analysis. Interactions were recorded and the resulting videos and transcripts of textual interactions were available for analysis. Our analysis focuses on the quantitative analysis of the text transcripts with qualitative analysis that includes observation of the audio/video recordings. We limit our quantitative analysis to the text transcripts to simplify the analytical space, as cultural assumptions about speech and writing may differ (Biber 1991). Moreover, by focusing on text, we are highlighting the effects of technological mediation on GVPN collaboration, which distinguishes these types of virtual networks from traditional, face-to-face networks. We also analyzed the text included in the networks’ summative presentations and reports.

Our methodological framework (Figure 1) is based on a mixed-method, grounded-theory approach (Glaser and Strauss 2009), which uses discourse-centered online ethnography (Androutsopoulos 2008) to drive subsequent analyses. More specifically, we use ethnographic observations to determine whether RQ1 is relevant to the experimental context, i.e. whether cultural assumptions about language are present in the GVPN interactions. Based on the types of cultural assumptions identified through the observations, we developed a survey that asked participants to rate their fellow participants based on the emergent categories.

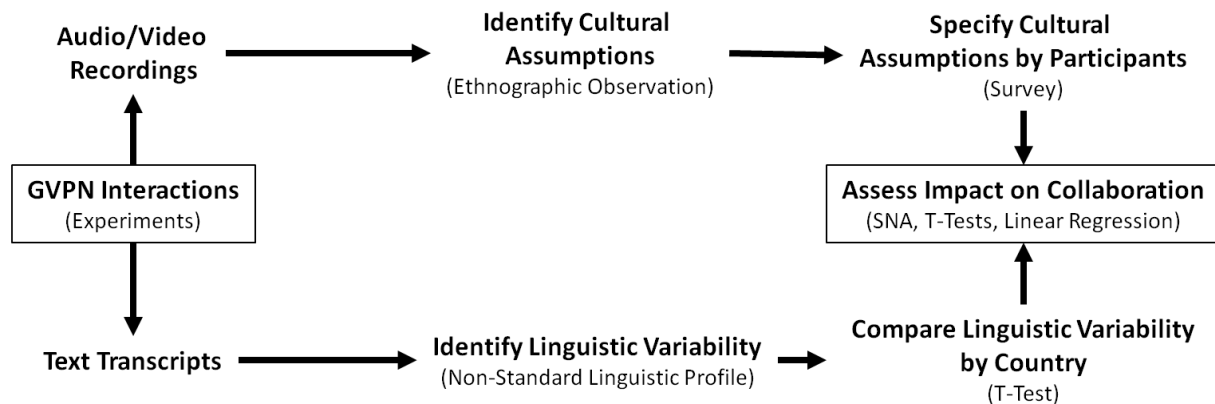


Figure 1. Methodological Framework

Because our goal is to explore the links between cultural assumptions about language and collaboration in GVPNs, we also examined the transcripts from the textual interactions of the participants. This analysis focused on determining whether there was variability in the linguistic styles employed by the participants to which cultural assumptions could be ascribed. Based on

each participant’s non-standard linguistic profile (Squires and Iorio 2014), we conducted a series of T-Tests to determine whether a particular country had a distinct linguistic style.

The final step in our methodology is to combine our results from the analysis of cultural assumptions with the analysis of linguistic variability to determine the impact of cultural assumptions about language on collaboration in the GVPNs. To this end, we used degree centrality (i.e. number of links from one node to another) and tie strength (i.e. total number of interactions) as indicators of each participant’s position in the network in order to identify structural holes and cliques. We used t-tests to determine whether there was a significant difference in the cultural assumptions by each participant and by team, and used linear regression to determine whether we could use the cultural assumptions to predict collaboration patterns, as indicated by interactional network structure.

## RESULTS

The first step in our analysis is to determine whether there is any variability in the linguistic styles of network participants and whether these styles align based on the participant’s native language. If we observe variability in language, then the linguistic context has the potential for cultural assumptions to shape language use and reaction to language use. To assess whether linguistic variability exists, we focus on spelling choices, particularly in cases where a standard and non-standard alternative are available (Sebba 2003). For instance, the preposition *to* can be realized as either <to> (standard) or <2> (non-standard). Although this type of variability is not typically associated with formal work contexts, it is strongly associated with instant messaging conversations across languages (Thurlow and Brown 2003). Thus, synchronous communication through text in a professional context is an ideal setting where cultural assumptions about the appropriateness of certain types of linguistic styles may be particularly salient. The sample transcript in Example 1 demonstrates that, in fact, these types of non-standard spelling styles are present in the GVPN interactions.

In Example 1, we see a range of non-standard spellings of various types including homophone spellings, reductions, and phonetic spellings (Androutsopoulos 2000, Iorio 2010). Homophone spellings use the sounds associated with a series of letters to replace words or series of letters that sound the same (e.g. Line 6, <b> for *be*, <2> for *too*). Reductions refer to cases where letters in a word are removed, which can significantly shorten the word (e.g. Line 12, <wrkt> for *worked*; Line 22, <chk> for *check*). The example of <wrkt> is also an example of a phonetic spelling, in that the past tense marker /ed/ is represented as a <t> because the [t] sound corresponds to the phonetic pronunciation of the past tense marker in *worked*. Phonetic spellings represent the ways that words are pronounced and can vary given the accent of the writer. For instance, in Line 20, an Indian participant writes *we’ll* as <vll>, reflecting both his native pronunciation of /w/ as [v] and reduction of the standard apostrophe. This type of linguistic variability suggests the presence of cultural assumptions by the writers (Sebba 2007), as selection of the non-standard variant implies that it is appropriate for the interactional context.

- 01. Ned1: ok, well another issue we had is that i think the top floor/ceilling is actually lower
- 02. Ned1: so the storeys are not on the same height
- 03. Ned1: and it also is still in imperial instead of n metric
- 04. Ind1: **k** now the top floor ceiling is 12 feet like other floors
- 05. Ned1: ok good

- 06. Ind1: **n** the units will **b** changed to metric **2**
- 07. Ned2: And, also the wall position should be changed because youve done a 2 storey add-on
- 08. Ind2: could **yu** explain about the wall positon?
- 09. Ned1: yeah well basically you should get it like to line up with the column and grid
- 10. Ind1: **u** mean on **fort** floor
- 11. Ned1: which floor? what is a fort floor?
- 12. Ind1: we have **wrkt** the top floor as per the screen shot **u** have sent through drop box.
- 13. US1: I think they're referring to the 4th (top) floor?
- 14. Ind1: **ya**
- 15. US1: On the 4th floor, the wall that is parallel with the balcony railings
- 16. US1: the wall past the structural columns.
- 17. US2: you need to move the wall back so it's flush with the existing columns
- 18. US2: Does that make sense?
- 19. Ind2: **ve** understand **tat**.
- 20. Ind1: **vll** create a opening (door) **der**
- 21. Ind1: **n vll** send **de** revised file in couple of mins
- 22. Ind2: **pls chk** mail

Example 1. Sample Transcript of GVPN Interactions (Non-standard Spellings Noted in Bold)

A cursory glance through Example 1 suggests that the use of these types of non-standard spellings are restricted to participants from specific countries. By focusing on the boldface terms in the example, the Indian participants appear to use a higher level of non-standard spellings compared to either the Dutch or American participants. The results in Table 1 confirm that this observation applies for the entire dataset. The analysis presented in Table 1 is based on comparison of the non-standard linguistic profiles (Iorio and Squires 2014) for the Indian, Dutch and American participants. A non-standard linguist profile is a comparative technique developed to provide a broad characterization of writing styles, and reflects the ratio of non-standard spellings to total spellings. Thus, the results indicate that 46.5% of spellings by the Indian participants are non-standard, while 5.4% are non-standard for the Dutch and 7.1% for the American participants. When these means are compared using an unpaired, two-tailed Student's T-test, results confirm that the non-standard linguistic style of the Indian participants is statistically distinct from both the Dutch and American participants.

Descriptive Statistics			T-Test			
Country	M	SD	Comparison	df	T	P
Ind	0.465	0.065	Ind-Ned	6	9.102***	<0.001
Ned	0.054	0.061	Ind-US	6	10.42***	<0.001
US	0.071	0.037	Ned-US	6	-0.493	0.639

Table 1. Comparison of Non-Standard Profiles

Having determined that linguistic variability exists between the networked teams, the next step in our analysis is to determine whether there is evidence of cultural assumptions present about this variability in the meta-commentary by the teams. Since the instant messaging interactions were logged and were able to be retrieved by any member of the team, much of the meta-commentary occurred through voice, particularly in cases when the Indian participants



were absent. Table 2 shows an example of meta-commentary that entails cultural assumptions about language, with the corresponding theme of the commentary and the number of times the comments of each type occurred throughout the study period.

The examples in Table 2 clearly demonstrate that not only were cultural assumptions about language present in the interactions, but they were wholly negative. From a thematic standpoint, the participants indicated that the writing style of the Indian participants was: 1) difficult to comprehend, 2) did not inspire trust, 3) was related to poor quality work, and 4) and suggested a lack of education. These findings are in line with similar studies from face-to-face contexts for speakers of regional dialects (e.g. Cargile and Giles 1997) and with findings from global virtual teams that link non-native language fluency (or comprehensibility) with the expected quality of work outputs (Kankanhalli et al. 2007). Because the meta-commentary focused extensively on cultural assumptions about comprehensibility, we developed a survey designed to quantitatively explore the relationship between comprehensibility and the linguistic styles of individual participants.

<b>Example</b>	<b>Theme</b>	<b>Count</b>
“I think I understand about one out of every five words they write.”	Comprehension	23
“I don’t trust that they understand what we asked them to do.”	Trust	9
“It’s not ok if they type like that in their section of the report.”	Quality	7
“Do you have to pass a writing test to get into university there?”	Education	3

Table 2. Examples of Language Evaluations by Theme

The 10-question survey was designed to assess the comprehensibility of each participant by asking respondents to rate the their collaborators based on a 5-point Likert Scale. The survey contained 3 focus questions and 7 distractors. The focus questions included:

1. How difficult was it to understand Person X? (1=very difficult, 5 = very easy)
2. How hard did you have to work to understand Person X? (1 = not hard at all, 5 = very hard)
3. How often did you have to ask Person X to repeat themselves? (1 = all the time, 5 = not often)

All three focus questions assessed comprehensibility but did so from different angles, which allowed us to assess the internal validity of the survey. We also included distractors, which included questions that focused on evaluation of the task outputs (e.g. How well did Person X execute Task Y?), and questions about the role of the technology (e.g. How well did Technology X support Task Y?). We also alternated the direction of the Likert scales to ensure the reliability of the results.

Results of the survey (Table 3) suggest that the writing by the Indian participants were rated as significantly less comprehensible compared to the writing of both the Dutch and American participants. Moreover, the comprehensibility rating for the Dutch and American participants were statistically indistinct. On a scale of 1-5 with 5 indicating highly comprehensible, the average rating for the Indian participants was 1.9, while it was 4.8 for both the Dutch and the American participants. However, as we might expect, the Indian participants rated their own comprehensibility as significantly higher compared to the ratings by the American and Dutch participants,  $t(6) = 2.31, p < 0.001$ . This result supports Sahgal’s (1991) observation that Indians, in general, preferred a more local style of English compared to the more formal style associated with Standard British English.

Descriptive Statistics			T-Test			
Country	M	SD	Comparison	Df	T	p
Ind	1.924	0.271	Ind-Ned	6	14.67***	<0.001
Ned	4.838	0.216	Ind-US	6	13.20***	<0.001
US	4.821	0.269	Ned-US	6	0.191	0.674

Table 3. Comparison of Comprehensibility Ratings

The results thus far have demonstrate that cultural assumptions about language exist in the GVPN interactions (RQ1) and that the style of the Indian participants is rated as less comprehensible by both the Dutch or the American participants. However, at this point, it is not clear what impact these cultural assumptions have on the ability of the GVPNs to collaborate effectively. Taking the interactional structure of the networks as an indicator of collaboration effectiveness, we built interactional matrices for both GVPNs based on who communicated with whom and used the comprehensibility rating as a node attribute with larger nodes indicating higher levels of comprehensibility. The resulting sociograms are presented in Figure 2.

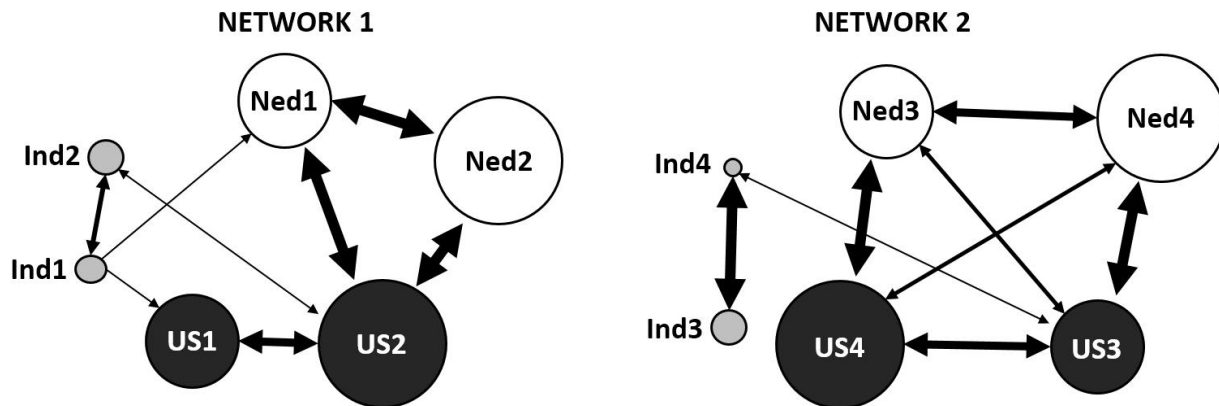


Figure 2. Interactional Structure for Networks 1 and 2 (Note: Larger nodes reflect higher comprehensibility ratings)

The sociograms in Figure 2 demonstrate that, to varying degrees, the Indian participants form subgroups within both GVPNs. In Network 1, Ind2 only has reciprocal ties with the network through US2. Although Ind1 has a higher degree centrality with two connections to the network, both of the connections are unidirectional. The unidirectional ties suggests that Ind1 was communicating with the network (e.g. by asking a question), but the network was not communicating with Ind1 (e.g. by providing a response). Note also that the tie strength or number of interactions by Ind1 and Ind2 with the network (as indicated by line weight) is also much lower compared to the interactions between the other members of the network. In Network 2, we observe a similar pattern, although only one member of the Indian team has any connection to other members of the network. The subgroup consisting of the American and Dutch teams in network two is a prototypical small network, with strong ties connecting each node, suggesting that information can flow freely between network members. These strong ties stand in contrast to the weak ties connecting the Indian team to the rest of the network.

While the visualization of the interactional dynamics for the two GVPNs in Figure 2 suggests that the Indian team is less central to the network and participates less, a statistical test is required to confirm whether this observation is significant. Tables 4 and 5 compare the mean

values for the degree centrality and tie strength of each participant by team through a t-test. The results confirm that the Indian participants have significantly lower degree centralities and tie strengths compared to either the American or Dutch participants.

The final step in our analysis is to determine whether we can use the comprehensibility ratings by the participants to predict both the degree centrality and the tie strength of the participants. Results of a linear regression analysis demonstrate that comprehensibility rating is significantly and positively associated with an increase in tie strength ( $\beta = 34.67$ ,  $p = 0.002$ ) and with an increase in degree centrality ( $\beta = 0.87$ ,  $p = 0.035$ ). In more concrete terms, we found that for an increase in comprehensibility rating by 1, the network members are predicted to interact approximately 35 more times and with approximately one additional network member. These summative findings demonstrate the powerful role that cultural assumptions about the comprehensibility of language can have on the interactional dynamics within GVPNs.

Descriptive Statistics			T-Test			
Country	M	SD	Comparison	df	T	P
Ind	2.000	0.816	Ind-Ned	6	9.102***	<0.001
Ned	2.500	0.577	Ind-US	6	10.42***	<0.001
US	3.500	0.577	Ned-US	6	-0.493	0.639

Table 4. Comparison of Degree Centrality

Descriptive Statistics			T-Test			
Country	M	SD	Comparison	df	T	P
Ind	60.75	35.72	Ind-Ned	6	2.85*	0.036
Ned	159.3	43.89	Ind-US	6	4.89**	0.003
US	191.0	39.47	Ned-US	6	1.04	0.345

Table 5. Comparison of Tie Strength

## DISCUSSION

In both of the networks we examined, the cultural assumptions about language negatively impacted network cohesion in terms of degree centrality and tie strength. We found that ratings for comprehensibility were negatively associated with non-standard spellings, except for the Indian participants, who rated their own way of writing higher than the rating by the either Dutch or American participants. For the Dutch and American participants, our results suggest that there was a shared cultural assumption about the appropriateness of using a less formal writing style in a professional context. This cultural assumption was not shared by the Indian participants, who aligned their linguistic practices with norms for the technological context of instant messaging (Thurlow and Brown 2003) and with the norms of Indian English from their local communities (Sahgal 1991).

We also found that participants who wrote less formally had lower tie strength and degree centrality compared to participants who were rated higher, indicating that they were less central to the interactions. This finding is not surprising because we expect that participants who are judged to be less comprehensible may be shifted to the interactional periphery, because over time, members would eventually seek information from others who they found easier to understand. In this experimental context, the lack of interaction with the Indian participants was resolved by the Dutch teams, who ultimately executed much of the modeling work assigned to

the Indian teams. In an authentic professional context, this resolution strategy may not be feasible and the professionals may be required to make explicit the perceived lack of comprehensibility while simultaneously fostering the “tolerance and empathy [that] are necessary to encourage participation in [a global virtual team] context” (Dubé and Paré 2001, p. 72). Although our research demonstrates that strong and negative cultural assumptions about the language choices of the Indian participants existed in the two GVPNs, at no time did any of the American or Dutch team members suggest (either directly or indirectly) that the Indians adopt a more formal—and in their view, comprehensible—style. However, participants may be aware that a direct confrontation may lead to the types of conflict described in Hinds and Mortensen (2005).

A conflict may result if the American and Dutch teams asked the Indian participants to alter their writing style to be more formal. The Indian participants could certainly accommodate this request to more closely reflect the linguistic style that they learned in school, but in doing so, would be forced to adopt the linguistic, and in this case, necessarily cultural practices of their Dutch and American teammates. In other words, it is not the case that the Indian participants were unable to write more formally. They chose a linguistic style that was based on their local community norms. For their local community, these norms are appropriate, as evidenced in the consistently positive comprehensibility ratings within the Indian subgroup. For the Indian subgroup, their writing style was meaningful in ways that were not for their Dutch and American collaborators.

The meaning associated with the Indian participants’ writing style is similar to both British Creole (Sebba 1998) and Gulf Arabic (Palfreyman and Khalil 2003). For both British Creole and Gulf Arabic, non-standard spellings can be used as a tool for communities to take an oppositional stance (Maybin 2007) to the dominant language. For many Indian communities, English is the language of the colonizer. The substitution of <der> for *there* and <ve> for *we* is a way that Indian communities can differentiate themselves from the written language of their colonial past by drawing on the sounds from spoken Indian English that distinguish it from spoken British English. For the Dutch participants, English is the language of work and of education and thus the formality of their writing follows naturally from the contexts in which language is used (Lakoff 1972). There is no colonial relationship between the Dutch participants and the English language, and thus, the Dutch view English as pragmatic language required for participation in a globalized industry that uses English as a lingua franca. English is also pragmatic for the Indians, but a historically-based ideology underlies the pragmatism. Regardless of whether the historical association between the Indian participants’ informal writing style is salient to them or not, it is embedded in their cultural practices, which is evidenced in the non-negative evaluations by the Indian participants of their own language. As we have demonstrated, the link between culture, meaning and language can impact the collaborative efficacy of GVPNs.

It is of critical importance to note that our findings do not suggest that the style of the Indian participants is inherently incomprehensible or that, to maximize comprehensibility, GVPNs should always adopt a more formal style. The findings suggest that, while a certain style may be acceptable for one cultural or native language group within a GVPN, it may be evaluated as not acceptable by another. These evaluations are one of the ways that linguistic diversity and the cultural assumptions about language can impact collaboration in GVPNs. The results may have been different if the network was composed of teams who made similar cultural assumptions about the appropriateness of less formal writing styles for work contexts like the Indian team (e.g. had the other teams come from a language background with a colonial

relationship to English such as British Creole). The effect of the American and Dutch teams' language ideologies on the structural position of the Indian team in the network shows evidence that their cultural assumptions were dominant. As we would expect, when the culture of one team within a network is dominant, collaboration is made more challenging (Lee-Kelley and Sankey 2008).

The most productive and culturally sensitive course of action for the participants would have been to hold an overt discussion about the Indian writing styles, allowing the Indian participants to help the network understand the cultural meaning and foundation of their language choices. By understanding the way that the Indian writing style reflects the ways that they pronounce words (e.g. substituting [v] for /w/) and how this linguistic practice is normative in many of the local contexts in their home communities, it may have helped the American and Dutch participants to better comprehend the Indian participants' writing while allowing the Indian participants to bring their cultural practices to the network collaborations. Perhaps ironically, Indian English writing practices emerged in response to the dominance of England during its 200-year period of colonial rule in India. Our results suggest that the standard variety of English has continued to play a dominating role within the GVPNs we observed. Our discussion of these results highlights the need for greater cultural and linguistic awareness and more specifically, in the ways the two concepts are inextricably linked (Brown 1994). In other words, individuals working in GVPNs must understand that negative evaluations of an individual's language choices are necessarily evaluations of their culture.

## **LIMITATIONS AND FUTURE RESEARCH**

Our results are limited because we only examined the text-based interactions within the GVPNs. We would expect to observe differences in the cultural assumptions associated with speech and writing (Biber 1991), in part, because linguistic choices are often more salient for writing compared to speech. In other words, if an individual's speech is difficult to understand, the individual may have little recourse to, e.g. modify the strength of their accent or grammatical constructions. GVPNs may be more willing to ask for clarification or repetition in the case of spoken language. However, for writing, individuals assume that non-standard spelling choices are strategic and that modification to an individual's writing style are feasible. While this is certainly the case (i.e. the Indian participants were capable of writing more formally), it ignores the cultural value of language and the ways that language reflects culture. Future research could productively examine the types of cultural assumptions associated with spoken and written language and how these assumptions may or may not differentially shape the interactional dynamics of GVPNs.

Our results are also possibly age-graded (Labov 2011), i.e. we may not expect to find writing styles with similar features present in the writing of older cohorts. However, the younger cohort that was studied will become the next professional cohort, and will bring with them these types of cultural assumptions about language to the workplace in the future. Thus, the research is limited by describing what the workplace may look like in the future, rather than describing its current state. This limitation notwithstanding, our research uses the linguistic practices of a younger cohort to provide an example of how language reflects culture and how cultural assumptions about language can shape the interactional dynamics of GVPNs. Future research can explore other types of linguistic diversity in GVPNs composed of acting professionals and the cultural assumptions present in authentic industry networks. One benefit to our study

methodology is that it can be replicated across a variety of GVPN contexts and modified to reflect the emergent cultural assumptions held by networks composed of workers from a variety of national, cultural and linguistic backgrounds. Our methodological framework described in Figure 1 scales both up (e.g. to examine larger networks) and out (e.g. to examine more diverse networks).

## **CONCLUSION**

Taken together, our results demonstrate that virtual networkers react (at times negatively) to the structural characteristics of their coworkers' written language and that these reactions can have implications for effective collaboration in the project work. Our research has highlighted how subtle differences in language choices are based on cultural practices and how it can be difficult for global virtual team members to develop tolerance for linguistic and, by extension, cultural difference. We have argued that prescriptions about the types of language choices that are acceptable in GVPN interactions may not be culturally sensitive and, in turn, may lead to interpersonal conflict and ultimately disruptive task conflict.

As projects become more global in scope, it becomes increasingly important to understand, not just that language and culture impact network dynamics, but how and why they impact networks in the ways that they do. By developing this understanding, we will be better suited to develop strategies for addressing the challenges that emerge when diverse teams execute complex project work. Our research pushes this line of inquiry forward by examining how globally distributed workers react to specific elements of the linguistic system and how these reactions impact network dynamics. Our findings have important implications for practice, in that they clarify the relationship between linguistic and cultural diversity and suggest that through understanding linguistic behavior, we are better able to minimize the negative impacts of cultural diversity on global virtual project network interactions.

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