Interpretation of uncertainty expressions

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Analysis and results

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To examine whether nationality alone, controlling for language-culture, affects interpretation of uncertainty expressions, the responses to questionnaire G made by German WPs were compared with responses to questionnaire G made by Austrian and Swiss WPs. To test whether interpretations of uncertainty expressions differ between U.S. CPAs and German-speaking WPs (Hypothesis 1), the mean responses to Part 1 of questionnaire E (CPA) were compared with the mean responses to Part 1 of questionnaire G (WP/German). To test the effect of language-culture (Hypothesis 2), controlling for any translation effect, responses to questionnaire E (CPA) were compared with the combined responses to questionnaire GE1 and the English part of GE2 (WP/English).

To test the effect of translation (Hypothesis 3), controlling for culture, the responses to Part 1 of questionnaire G (WP/German) were compared to the responses to Part 1 of GE1 (WP/English)—a between subjects comparison. Hypothesis 3 was also tested by comparing the responses to GE2-Part 1 (WP/German) with the responses to GE2-Part 2 (WP/English)—a within person comparison. A comparison of WPs' perceptions of those expressions where two different German words have been used for one English word provides additional insight into the effect translation has on the interpretation of IAS.

Responses to Part 2 of questionnaires E, G, and GE1 were also compared across the three groups (CPA, WP/German, and WP/English) to test for overall, culture, and translation effects with regard to the range of probabilities assigned to uncertainty expressions.

ANALYSIS AND RESULTS

Point Estimate Probabilities

The first step in the analysis was to test for differences in the point-estimate

interpretations (Part 1 of the questionnaire) of uncertainty expressions made by the German respondents and those made by the Swiss and Austrian respondents. One-way ANOVA found only one expression ("mit der Aussicht") for which a significant difference exists. Post hoc comparisons show a significant difference between the German and Austrian groups of WPs on this expression. Because of the small number of Austrian respondents (n=8), treating the Austrians as a separate group in ANOVA is tenuous. Therefore, the Austrian and Swiss responses were combined and compared with those of the German group. There was only one significantly different mean response between these two groups ("erwartet"). When the Austrian and German groups were combined and compared with the Swiss group, no significant differences were found. The general lack of significant differences between these three groups of German-speaking WPs allows us to conclude that nationality alone does not cause differences in interpretation of uncertainty expressions. Indeed, there appears to be a common interpretation among German-speaking WPs regardless of nationality. Because of this, the responses of these three groups are combined for subsequent hypothesis testing. This combined group is referred to as WP/German (n=109).

Part 1 of questionnaire GE1 and part 2 of questionnaire GE2 were the same. In both cases, German-speaking WPs were asked to assign point estimate probabilities to English expressions. A comparison of the results of these two groups resulted in no significant differences in means across the 16 expressions. The responses to these two questionnaires are combined into a group referred to as WP/English (n=62) for subsequent testing.

Table 3 reports the mean probability assigned to each English uncertainty expression by the CPA and WP/English groups (Columns 3 and 4), and to the German translations by the

WP/German group (Column 5). Several expressions included in this study have been examined repeatedly in previous research involving U.S. subjects. The mean CPA responses to "probable" (71.37%) and "likely" (70.89) are similar to the responses to these terms in prior studies.[1] In addition, as appears to be the case in the current study, several studies have found these two terms to be synonyms. The mean probability associated with "remote" (16.38%) in the current study is higher than has been found in previous accounting studies. Reimers' (1992) had a mean of 9.4% for her auditor group and Amer, Hackenbrack, and Nelson (1994) had a mean of 12.33% for their in-context study.

[Insert Table 3 here]

The CPA responses also exhibit more symmetry with regard to mirror-image pairs than has been found in previous research reported in the psychology literature. The mean probabilities assigned to "probable" and "not probable" sum to 104 percent, and "likely" and "unlikely" sum to 98 percent, as compared with sums of approximately 85 percent in other studies. The negative expressions in the pairs are assigned probabilities much closer to the 50 percent midpoint than has been found in previous studies.

As has been found in prior research, there is considerable between-subject variability in the CPA responses. Standard deviations range from 9.70 ("reasonable assurance") to 23.54 ("no longer probable"). Standard deviations are much smaller for the positive expressions (those with a mean probability > 50%) (average 13.79) than for the negative expressions (average

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1 Reagan, Mosteller, and Youtz (1989) reported that, across seven prior studies, the range of mean probabilities assigned to "probable" was 70-77% and to "likely" was 67-75%.

20.91). This is consistent with results found by Amer, Hackenbrack, and Nelson (1994).

To determine whether familiarity with IAS influences interpretation of uncertainty expressions used in IAS, respondents in each of the WP/German and WP/English groups were split into two groups (high = very familiar or familiar, and low = somewhat familiar or not familiar).[2] No significant differences were found between the high and low groups for the WP/German respondents. However, the high IAS familiarity group for the WP/English respondents assigned significantly higher mean probabilities than the low familiarity group on three uncertainty expressions: "not probable," "no longer probable," and "remote."

The WP/English respondents were also split into two groups based on their level of English comprehension (high = excellent or good, low = satisfactory or rudimentary). No significant differences were found between these two groups in mean probabilities assigned to the 16 English expressions to which they responded. Level of English comprehension did not affect their responses to the uncertainty expressions in English. Similarly, there were no significant differences in mean responses between those WP/English respondents with audit experience in English-speaking countries and those without.

Tests of Hypotheses

The ANOVA results in Table 3 indicate significant differences across the three groups for 14 of the 21 uncertainty expression comparisons (Column 6). To test Hypothesis 1 (overall effect), the mean point-estimates for the CPA and WP/German groups were compared. Bonferroni post-hoc comparison tests indicate significant differences for 8 of 21 comparisons

(shown in Column 7 of Table 3). Differences are not concentrated on either side of the probability scale. Three of the expression-pairs with significant differences have mean probabilities greater than 50% and five have means less than 50%. Differences exist between the CPAs and WPs in the evaluation of "expected" and both German translations of "expected" ("voraussichtlich" and "erwartet"), and in the evaluation of "not expected" and "nicht erwartet". There is also a difference between "not probable" and "nicht wahrscheinlich" and "no longer probable" and two translations of this expression ("nicht mehr erwartet" and "nicht mehr wahrscheinlich"). However, no overall difference arises when "no longer probable" is translated as "voraussichtlich nicht mehr." Differences also exist between the CPAs' assessment of "assurance" and the WPs' assessment of "Gewissheit," with the WPs attaching a much higher probability to the German term, and between "seriously in question" and "sehr zweifelhaft," where the WPs attach a much lower probability to the German expression.

To test Hypothesis 2 (culture effect), the mean point-estimates for the CPA and WP/English groups were compared. Post-hoc comparison tests show that means are significantly different for nine of 16 comparisons (Table 3, Column 8).[3] For all but two of these items ("assurance" and "remote"), the WPs' mean responses were lower than those for the CPAs. WPs assign a significantly higher probability to "assurance" (the highest probability for WPs) and do not assign as low a probability to "remote" as do the CPAs (the lowest probability for CPAs). Because both groups were evaluating uncertainty expressions in English, these differences can be

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2 There was an insufficient number of CPAs indicating a high level of familiarity with IAS to warrant a similar test for this group.
3 A significant difference exists for 12 of 21 items in Column 8. However, three of these significant items are duplicates ("expected" is translated into two German expressions, "no longer probable" is translated three different ways), thus there are really only nine

attributed to differences in language-culture, and not to translation.

To test Hypothesis 3 (translation effect), the responses from the WP/English and WP/German groups were compared. Means are significantly different for four expression-pairs (see Table 3, Column 9). The four German expressions in these pairs are the two extreme high probabilities ("Gewissheit" 96.73% and "so gut wie sicher" 91.87%) and the two lowest probabilities ("Wahrscheinlichkeit ausserst gering" 11.46% and "sehr zweifelhaft" 13.05%). In all four cases, the German expression is assigned a probability that is more extreme than the English expression it translates.

To further test for a translation effect, the WPs' responses to Part 1 (German expressions) and to Part 2 (English expressions) of questionnaire GE2 were compared for those individuals who responded to both parts. (A total of 33 responded to both parts, but two were eliminated because of inconsistent responses in Part 1.) The results of paired samples t-tests reported in Table 4 indicates eight expression-pairs with significant differences. The four extreme (two highest and two lowest) expression-pairs were again different, with the German expression having the more extreme probability. In addition, significant differences were found for the two translations of the word "probable" ("wahrscheinlich" and "hinreichend wahrscheinlich"), the translation of "not probable" ("nicht wahrscheinlich"), and one of the translations of "no longer probable" ("nicht mehr wahrscheinlich"). In each of these cases, the WPs assigned a more extreme probability to the German expression than to its English equivalent.

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significant differences in Column 8.

[Insert Table 4 here]

Comparing the culture and translation effects with the overall effect results in Table 3, it appears that the culture and translation effects cancel out for two expression pairs. CPAs assign a mean value of 91.75% to "virtually certain," whereas WPs assign a significantly lower value of only 86.24% to that expression (evidence of a culture effect). Although WPs assign a mean value of 86.24% to "virtually certain," they assign a significantly higher value of 91.87% to its translation "so gut wie sicher" (translation effect). The direction and magnitudes of the two effects offset such that there is no difference between the CPAs assessment of "virtually certain" (91.75%) and the WPs assessment of "so gut wie sicher" (91.87%). A similar phenomenon arises for the expression pair "remote/Wahrscheinlichkeit ausserst gering."

To summarize, of the eight significant differences between CPA and WP/German responses (Table 3, Column 7), six are the result of a culture effect alone, but these six differences relate to only three different expressions ("expected," "not probable," and "no longer probable"). One difference is the result of a translation effect alone ("seriously in question/sehr zweifelhaft"), and one is the result of both culture and translation effects ("assurance/Gewissheit").

As noted earlier, several English expressions ("expected," "probable," "likely," and "no longer probable") were translated into German in two or three different ways. The comparison of the CPA and WP/German responses indicated no significant difference for either of the two different translations for "probable" and "likely" or for one of three translations of "no longer probable." On the other hand, the interpretation of two translations of "no longer probable"

were significantly different between the CPA and WP/German groups, as were both translations for "expected."

To investigate whether different translations of a single English expression were assigned similar probability estimates by the German-speaking WPs, paired-samples t-tests were conducted on responses provided by the WP/German group. The results in Table 5 indicate that the two different translations of "expected" and "probable" are interpreted as equivalent by the German WPs. However, the translations for "likely" and "no longer probable" are interpreted differently.

[Insert Table 5 here]

Combining the results from the CPA vs. WP/German comparison in Table 3 (Column 7) and the results in Table 5, the following conclusions can be reached. German WPs interpret "erwartet" and "voraussichtlich" to have similar meaning but different from the meaning CPAs attach to the word "expected." German WPs interpret "voraussichtlich" and "wahrscheinlich" differently, but neither is significantly different from the interpretation CPAs give to "likely." The three translations of "no longer probable" are interpreted differently by the German WPs and two of these are significantly different from the interpretation given to the original English by the CPAs. Only the translation "voraussichtlich nicht mehr" captures the same level of probability as the phrase "no longer probable." For this particular uncertainty expression, the specific translation from English to German could affect the manner in which the related standard is applied.

Range of Probabilities

In Part 2 of questionnaires E, G, and GE1, respondents indicated the range of probabilities they associated with six of the uncertainty expressions from Part 1. ANOVA results to test for differences in mean probability ranges are reported in Table 6. Of 329 respondents to questionnaires E, G, and GE1, 21 were eliminated from this analysis either because they did not respond to this part of the questionnaire (n=7), they had one or more negative ranges (n=3), or they provided logically inconsistent responses (n=11). Inconsistency was defined as the lower range value for "not probable/nicht wahrscheinlich" being greater than the upper range value for "probable/wahrscheinlich."

[Insert Table 6 here]

For the most part, probability ranges assigned to the various uncertainty expressions did not differ across the three respondent groups (CPA, WP/English, and WP/German). Significant differences in mean probability range exist only for "virtually certain/so gut wie sicher" and "probable/wahrscheinlich."

Bonferroni post-hoc comparison tests show that there is a significant difference in probability ranges assigned by the WP/English and WP/German groups on "virtually certain/so gut wie sicher" (translation effect). There is also a significant difference between the CPA and WP/English groups on "probable" (culture effect). But there is no overall effect for either expression pair. In other words, although there is a broader range of probability associated with "virtually certain" by the WPs than by the CPAs, there is no difference in the probability range associated with "virtually certain" by the CPAs and "so gut wie sicher" by the WPs. Similarly, there is no significant difference in the range of probability associated with "probable" by CPAs

and with "wahrscheinlich" by WPs. This result argues for translation of IAS into the foreign language rather than asking non-English speaking accountants to interpret the English expressions.

The magnitudes of the mean ranges suggests that the expressions "probable" and "not probable" convey less precise concepts of probability than do expressions such as "reasonable assurance" and "remote." The same is true for the German translations of these expressions.

SUMMARY AND CONCLUSIONS

This study has finds that nationality alone (at least among German-speaking countries) does not result in significant differences in probabilities assigned to uncertainty expressions used in International Accounting Standards. However, significant differences exist between English-speaking U.S. CPAs and German-speaking WPs for a large number of the uncertainty expressions included in the study. The results indicate that for some expressions, the difference in mean probability assignments can be attributed to a difference in the language-culture of the respondent groups. The greatest difference is for the expression "assurance," which connotes a much higher level of probability to the German speakers than to the U.S. CPAs.

Results also indicate that for extreme probability expressions (highest and lowest), the translation from English to German results in significant differences in interpretation. This raises the question whether this effect is a result of poor translation or whether the English expression has no direct counterpart in German. For example, is "sehr zweifelhaft" not the best translation of "seriously in question" or is there no direct linguistic mapping of "seriously in question" into German? Results related to the various German translations of the phrase "no longer probable" indicate that, at least for this uncertainty expression, some translations are better than others. The