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Keep Calm and Learn the Language: Do Multilinguals Have Lower Intolerance of Uncertainty than Monolinguals?

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Abstract

This paper presents the results of an observational study on the relationship between multilingualism and lower Intolerance of Uncertainty (IoU). A group of over two hundred multilingual and monolingual individuals filled in an online survey that contained items about one's language profile, cross-cultural experience, and the Intolerance of Uncertainty Scale-12 (IUS-12) – a psychometrically-sound instrument to assess one's vulnerability towards uncertain situations on an emotional, behavioral and cognitive level. We ask whether highly multilingual people are less likely to fear unknowns as a result of their exposure to linguistic and/or cultural uncertainty while learning foreign languages and/or staying abroad. The results show that an advanced knowledge of multiple languages and longer stays abroad correlate with lower aversion towards uncertain situations, thus, lower scores on the IUS-12. The study opens up new avenues for further investigation into how multilingualism and multiculturalism shape one's cognition and might have positive effects on mental well-being.

Keywords: multilingualism; multiculturalism; intolerance of uncertainty; cognition; well-being

Introduction

Acquiring one's first language/s seems effortless even though it is not: first language acquisition challenges the learner with demands on memory (Mollica & Piantadosi, 2019), and a myriad of situations in which word learning happens under conditions of referential uncertainty (Medina, Snedeker, Trueswell, & Gleitman, 2011; Quine, 2013). In contrast, foreign language (L2) acquisition neither looks, nor is easy. A common challenge to both first and L2 acquisition is uncertainty. Being a hallmark of life, uncertainty – having incomplete information – is especially characteristic of the initial (and sometimes also later) stages of L2 learning. For instance, inability to infer the meanings of words in a text, grasp an idiomatic expression or a joke in conversation, or fully understand one's interlocutor.

Dağtaş and Şahinkarakaş (2019) identify three categories of factors that can lead to uncertainty: classroom factors (i.e. uncertainty about the task and language-related uncertainties, such as vocabulary or grammar), social factors (i.e. disagreements and negotiations with group members) or cognitive factors (i.e. students' lack of knowledge, misunderstanding or lack of critical thinking skills). This study focuses on factors within the first category. Students in Dağtaş and Şahinkarakaş (2019) study reported uncertainties around vocabulary (i.e. unknown or confusing words) and grammar. It is, however, not so much the difficulties they encountered but rather their reaction to them that is of interest. While some students appraised such instances of uncertainty positively and interpreted them as a source for creativity and motivation, others experienced them as sources of anxiety or frustration.

In order to proceed with learning, however, one has to be able to face unknowns. Interestingly, Dewaele and Wei (2013) have shown that multilinguals, i.e. individuals with competence in multiple languages, have higher tolerance for ambiguity – the tendency to perceive ambiguous situations as desirable – than monolinguals. Dewaele and Wei (2013) linked a psychological construct and a lower-order personality trait, Tolerance for Ambiguity (TA), to multilingualism and suggested that the experience of having to operate in a foreign language and culture result in an increased ability to tolerate ambiguity. In addition, other recent work has revealed the relationship between multilingualism/multiculturalism and various psychological dimensions, including Cognitive Empathy (Dewaele & Wei, 2012) and Open-mindedness (Dewaele & Van Oudenhoven, 2009; Korzilius, van Hooft, Planken, & Hendrix, 2011).

The links between competence in multiple languages and cognition is relevant in light of a wider debate in the literature. This debate specifically concerns the existence of cognitive advantages that result from a life-long management of two languages. For instance, research has shown the delay of dementia by around 4 years (Alladi et al., 2013; Bak, Nissan, Allerhand, & Deary, 2014; Bialystok, Craik, & Freedman, 2007) and a better recovery after stroke (Alladi et al., 2016) in bilinguals compared to monolingual peers. Bilinguals have also been reported to have better executive functioning than monolinguals (Abutalebi et al., 2012; Bialystok, Craik, Klein, & Viswanathan, 2004); however, see Paap and Sawi (2014) for a different view. While experience regarding the management of two languages has been suggested to have implications for real life outcomes, research on the cognitive and

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psychological benefits of multilingualism/multiculturalism is scarce. The current study is an attempt to expand on this line of work.

Here, we linked multilingualism to a different psychological construct than TA, namely, the Intolerance of Uncertainty (IoU). TA and IoU are two related yet distinct concepts. Both have been conceptualised in terms of individuals' 'intolerance' towards unpredictable or ambiguous situations or contexts and their reaction towards such situations. However, TA is present-oriented while IoU is future-oriented, i.e. individuals with low TA have difficulty accepting a present situation that is ambiguous while individuals who are intolerant of uncertainty, interpret the future as a source of discomfort due to its unpredictability (Grenier, Barrette, & Ladouceur, 2005). In that way, IoU is more far-reaching than TA (Furnham & Ribchester, 1995). Due to their related yet distinct nature, it was the aim of this study to explore if the observations around the link of TA and multilingualism (Dewaele & Wei, 2013), could also be extended to IoU.

Intolerance of Uncertainty

Intolerance of Uncertainty (IoU) has been conceptualized as the tendency to react negatively on an emotional, cognitive, and behavioral level to uncertain situations and events (Dugas, Buhr, & Ladouceur, 2004). People who are intolerant of uncertainty worry about the possibility of a negative event occurring even when it is highly unlikely that it will occur, and also tend to interpret all ambiguous information as threatening (Carleton, Sharpe, & Asmundson, 2007). The tendency to worry has nothing to do with daily stressors (Chen & Hong, 2010). The daily hassles of life are not required for worry to emerge. Dispositional characteristics contribute more towards higher Intolerance of Uncertainty than actual life events, however, those higher in Intolerance of Uncertainty do experience greater anxiety upon exposure to daily hassles (Chen & Hong, 2010).

Scoring low on the Intolerance of Uncertainty Scale-12 (Carleton, Norton, & Asmundson, 2007) – the instrument developed to measure IoU – means that one is not bothered by unknowns. The crucial difference between the two constructs, TA and IoU, is that only the IoU can directly be linked to one's psychological well-being. The literature shows links between IoU, worry and anxiety (Carleton et al., 2012), in that increased IoU predisposes one for acquiring pathological worry, which in turn may lead to developing anxiety at some point in life.

Current study

Here we asked whether there exists a link between low IoU and multilingualism/multiculturalism? Upon showing this link, further experimental research could be conducted to understand whether the multilingual experience could work as a protective factor in the domain of mental well-being.

We conducted an observational study to examine the relationship between one's competence in multiple languages and the degree to which one is bothered with uncertainty. In addition, we examined the link between multiculturalism and IoU. Multilingualism was defined as the number of languages one knows and self-assessed language proficiency whereas multiculturalism was operationalized as the length of time one spent living abroad. The data were sampled online via an open-access anonymous survey that was open between September 2017 and May 2019. Snowball sampling was used to recruit participants. A link to the survey was shared on social networking sites among personal contacts who then shared it further. It was hypothesized that:

Hypothesis 1a: Participants with more languages will have significantly lower scores on the IUS-12.

Hypothesis 1b: Participants with advanced knowledge of multiple languages will have significantly lower scores on the IUS-12.

Hypothesis 2: Participants with longer duration of time spent living abroad will have significantly lower scores on the IUS-12.

Method

Participants. A total of 244 individuals filled in the survey, of whom 228 (151 females and 66 males)[1] completed the survey fully. The sample consisted of 214 multilinguals and 14 monolinguals. The majority of participants (83%) were between 18 and 45 years of age. Participants were highly educated: 76% had either a Master's degree or a PhD. The individuals in the sample represented 43 different nationalities from across the world, with the largest proportion of participants coming from the United Kingdom (22%), Spain (9%), Turkey (9%), and the USA (8%).

Instrument. The survey included questions about participants' language background and language use, cross-cultural experience, as well as the Intolerance of Uncertainty Scale-12 (Carleton et al., 2007), and socio-biographical items (i.e. age, gender, country of origin, educational level, socio-economic status).

The first section of the survey was designed to provide researchers with information related to participants' language background and language use. It included items about the number of languages participants have learned/studied (the maximum number they could state was 8), the age at which participants started to acquire each language (the minimum was 0), self assessment of their oral and written proficiency on a scale from 1 = "beginner" to 5 = "proficient" in all reported languages, and the frequency of use of their languages. The next section of the survey aimed to collect information regarding participants' multicultural experiences and it asked whether participants have lived/stayed abroad for more than three months. If the participant's answer was "yes", then the next question asked about the duration of their stay abroad in total, and whether they felt that they belonged to more than one culture. The seven categories that specified the duration of the stay abroad were as follows: "up to 6 months", "up to

[1] The rest either chose "Other" (n = 3) or "Prefer not to say" (n = 8).

1 year", "up to 2 years", "up to 5 years", "up to 10 years", "up to 20 years" and "20 or more than 20 years". The cut-off of three months was chosen following Dewaele and Wei (2013) who state that three months is a common lower limit for studies on effects of study abroad. In the third section, participants were presented with the Intolerance of Uncertainty Scale-12 (Carleton, Norton, & Asmundson, 2007) that was used to assess participants' reactions to uncertain situations. The IUS-12 is an abbreviated version of Intolerance of Uncertainty Scale (IUS) developed by Freeston, Rhéaume, Letarte, Dugas, and Ladouceur (1994). The examples of items on the reduced 12-item scale include: "I always want to know what the future has in store for me" and "When I'm uncertain, I can't function very well". Participants rate the twelve items on a 5-point Likert scale ranging from 1 = "not at all characteristic of me" to 5 = "entirely characteristic of me." The short IUS displays a two-factor structure: Prospective anxiety (i.e. fear of uncertainty based on future events) and Inhibitory anxiety (i.e. uncertainty inhibiting action), and shows sound psychometric qualities. The scale has excellent internal consistency, reflected in $\alpha > .90$, excellent convergent and divergent validity as well as good test-retest reliability (Carleton et al., 2007).

Measures. The measures used in the analysis included a number of continuous (1 - 5) and categorical (6 - 9) variables:

1. **Total number of languages** was generated by counting all languages that one reported having learned.

2. **Total number of foreign languages** was generated by subtracting 1 (in the case of participants with one first language) and 2 (in the case of simultaneous bilinguals, i.e. people who acquired two languages simultaneously from birth) from the total number of languages. When listing the languages that one spoke, an individual was asked to indicate "0" as the age of acquisition for the native language or languages. We used this piece of information to determine whether or not a participant was a simultaneous bilingual.

3. **Global language proficiency** was generated by summing up the ratings on the oral and written proficiency across all reported languages. The maximum possible score was 80.

4. To create **global foreign language proficiency**, the proficiency score associated with one's native language or native languages (if a given participant was a simultaneous bilingual) was subtracted from the global language proficiency score.

5. **Intolerance of Uncertainty** was generated by converting the Likert-type responses on the IUS-12 to numeric values and summing them up to obtain a total score for an individual. This score could range from 12 to 60.

6. **Duration abroad**

7. **Age**

8. **Gender**

9. **Educational level**.

Analysis

In order to investigate the relationship between continuous measures, correlation tests were used whereas regression analysis was employed to assess the relationship between categorical variables and Intolerance of Uncertainty. A hierarchical regression analysis was conducted to determine to which extent Intolerance of Uncertainty could be predicted on the basis of multilingualism (i.e. number of languages known, language proficiency) and multiculturalism (i.e. duration of time spent living abroad).

Results

Data normality checks were performed by means of a visual inspection and Shapiro-Wilk tests on the variables of interest. The variables were not normally distributed, thus, the results from non-parametric tests are reported: Spearman's correlations, the Kruskal-Wallis and Mann-Whitney U tests. For pairwise comparisons, we used the Bonferroni correction, with the *p*-value set to .01

Demographic characteristics. The multilingual participants were highly multilingual: exclusive of the native language or languages, the median number of languages known was 3. Regarding the cross-cultural experience, 72% of participants have lived/travelled abroad for three months or longer. Slightly more than half of the whole sample (51%) felt they belonged to more than one culture, and the same percentage of people used a language that was not their native one most of the time in their daily lives. 57% of participants have travelled abroad for vacation twice or more than twice, which was used as a proxy for their socio-economic status.

Correlational relationships. Table 1 indicates the correlations among the variables of interest, as measured by Spearman's *rho*. To highlight the most important results, it should be noted that the proficiency across all languages was significantly negatively related to IoU, as was global foreign language proficiency, suggesting that the more proficient participants had lower scores on the IUS-12. No significant association, however, was observed between the number of languages and the IoU, nor between the number of foreign languages and the IoU.

Intolerance of Uncertainty and multilingualism. Although a correlation between the number of languages and one's score on the IUS-12 was non-significant, it was in the expected direction. We, thus, decided to zoom in on the trend showing that highly multilingual people with the knowledge of 7 and 8 languages tended to have lower IoU (n = 24, *mean* IoU = 27.04, *SD* = 10.11) compared to monolinguals (n = 14, *mean* IoU = 37.14, *SD* = 10.44), and also the latter group had, on average, higher scores on the IUS-12 than bilinguals (n = 28, *mean* IoU = 26.14, *SD* = 8.55). The three groups were compared and the Kruskal-Wallis test indicated that the result was significant, $X^2(2) = 10.09$, $p < .01$., $\eta^2 = 0.1$, revealing a difference in the ranks associated with the scores on the IUS-12 between the three groups. For pairwise comparisons, we ran Mann-Whitney U tests. The difference between

Variable	1.	2.	3.	4.	5.
1. Total number of languages	–	0.99	0.87	0.85	-0.11
2. Total number of foreign languages	0.99	–	0.86	0.86	-0.12
3. Global language proficiency	0.87	0.86	–	0.95	**-0.14***
4. Global foreign language proficiency	0.85	0.86	0.95	–	**-0.15***
5. Intolerance of Uncertainty	-0.11	-0.12	-0.14	-0.15	–

Note: ***p < .001; ** p < .01; *p < .05.

Table 1: Correlation matrix showing Spearman's correlations between variables of interest

the monolingual group and the bilingual group was significant, $U = 313$, $p < .001$ as was the difference between the monolingual group and the multilingual group, $U = 252.5$, $p < .01$. The bilingual and multilingual groups did not differ, $U = 324.5$, $p = .8$.

Intolerance of Uncertainty and multiculturalism. A regression analysis was carried out to predict IoU using duration abroad as predictor with 8 categories, i.e. the seven categories each representing different amount of time spent living abroad and the eighth category representing participants who had never lived abroad. The result was significant, $F(7, 220) = 2.94$, $p < .01$, $R^2 = .06$. On the basis of this result that revealed that the longer one lived abroad, the lower their score on the IUS-12 was, participants were grouped into 3 groups: a group with no experience living abroad ("no duration"), a group with up to 5 years of experience living abroad ("short duration"), and a group with more than 5 years of experience living abroad ("long duration"). A significant Kruskal-Wallis test, $X^2(2) = 14.64$, $p < .001$, $\eta^2 = .05$ revealed that there was a difference in the ranks of scores on IUS-12 between the groups. For pairwise comparisons, we ran Mann-Whitney U tests. When the "no duration" group and "long duration" group were compared, the result was significant, $U = 1338.5$, $p < .0001$ while the difference between "no duration" group and "short duration" group was just significant, $U = 3563.5$, $p < .01$. The difference between "short duration" group and "long duration" group was not significant, $U = 2821$, $p = .07$.

Intolerance of Uncertainty and age. A linear regression was run to predict IoU using age as predictor with 5 categories[2] ("from 18 to 25", "from 26 to 35", "from 36 to 45", "from 46 to 55", and "from 56-65"), it was significant, $F(4, 220) = 3.29$, $p < .01$, $R^2 = .03$. On the basis of this result that seemed to indicate that advanced age was related to being lower on IoU, the effect of age on the IoU was further examined by collapsing the first 2 age groups into: "younger adults" and the other 3 groups into "older adults". The two groups, younger and older adults, differed in terms of the scores on the IUS-12, $U = 7729.5$, $p < .001$.

Regression model. A hierarchical multiple regression analysis was conducted to determine whether Intolerance of Uncertainty could be predicted on the basis of Global language proficiency, Duration abroad (i.e. the amount of time one spent living in a foreign country), and Age. Given that Total number of languages did not significantly correlate with Intolerance of Uncertainty, this variable was not included in the regression analysis.

At Stage 1, Global language proficiency contributed significantly to the regression model, $F(1, 226) = 5.83$, $p < .01$, $R^2 = .02$. Global language proficiency accounted for 2.1% of the variation in the IoU. At Stage 2, Duration abroad was added to the model. The model was significant, $F(3, 224) = 5.41$, $p < .001$, $R^2 = .07$, $R^2_{Adjusted} = 0.6$. Duration abroad explained an additional 3.4% of variation in the IoU. Global language proficiency ceased to be a significant predictor, $p = 0.23$. At Stage 3, adding Age to the model explained an additional 1.76% of the variation, $F(7, 217) = 3.51$, $p < .001$, $R^2 = .10$, $R^2_{Adjusted} = .07$[3]. The most important predictor of the IoU was Duration abroad. Together the three independent variables accounted for 7.3% of the variance in IoU.

The potential effects of gender, socio-economic status, and education on the Intolerance of Uncertainty were also ascertained. None of these factors had an effect on the IoU: gender ($p = .9$), socio-economic status ($p = .22$), education ($p = .09$).

Discussion

The current study examined the potential relationship between multilingualism/multiculturalism and Intolerance of Uncertainty, hypothesizing that multilinguals would be better able to tolerate uncertain situations compared to monolinguals. In recent years, research has begun to uncover links between multilingualism/multiculturalism and various psychological dimensions and lower-order personality traits, such as Tolerance for Ambiguity (Dewaele & Wei, 2013; Van Compernolle, 2016), Cognitive Empathy (Dewaele & Wei, 2012), and Open-mindedness (Dewaele & Van Oudenhoven, 2009; Korzilius et al., 2011). These studies show that multilingualism confers individuals with benefits: multilinguals are more open-minded and show increased cultural empathy compared to monolinguals. In the current study, we examined whether similar links exist between IoU, which reflects one's aversion to uncertain, unknown situations (Carleton, 2016), and competence in multiple languages and cultures as indexed by the number of languages known by an individual, language proficiency and the duration of time spent living in a foreign culture. The propensity to fear unknowns – the perceived absence of information at any level – is the key component in

[2]Instead of the six categories in the questionnaire, 5 categories were used because there were no participants over 65 years of age.

[3]$N = 225$ due to missing data

the development and maintenance of worry which can subsequently lead to anxiety (Dugas, Gagnon, Ladouceur, & Freeston, 1998). If a robust link between multilingualism and lower IoU exist, this could have relevant practical implications for mental well-being.

The first hypothesis (H1a), knowing more languages is related to lower IoU, was partially confirmed in this study. Although there was a trend for people with competence in multiple languages to have lower scores on the IUS-12 (i.e. the relationship was negative) compared to people with the knowledge of fewer languages, it was not significant. Having taken a closer look and compared the monolingual and highly multilingual group, we saw that multilingualism had an effect on the IoU, with multilinguals scoring significantly lower than monolinguals on the IUS-12. That is, multilinguals can tolerate uncertainty significantly more than monolinguals. While this result should be interpreted with caution as the monolingual sample was very small, it does demonstrate that in the future, having a sample with a larger group of monolinguals, it would be possible to show a reliable link between multilingualism and lower IoU. A small number of monolinguals is attributable to a difficulty of finding such individuals in general, in that the vast majority of people in the world have some knowledge of L2 (Baker, 2011).

The link between more languages spoken and various psychological dimensions has not been consistently found, however. Dewaele and Stavans (2014) did not observe the relationship between the number of languages and Cultural Empathy, Open-mindedness and Social Initiative whereas Dewaele and Wei (2012) did observe a significant association between the knowledge of more languages and Cognitive Empathy. The discrepancy in findings can perhaps be explained by the number of participants in these studies: Dewaele and Wei (2012) had responses from over 2,000 participants while our study and that by Dewaele and Stavans (2014) each had around 200 participants. Regarding the proficiency in various languages (H1b), which is a more fine-grained measure of multilingualism than the number of languages, and the IoU, we did observe a significant association, albeit with a small effect size. Taken together, the results suggest that multilingualism and the IoU are linked; however, the strength of this link varies depending on the measure of multilingualism that is employed (i.e. the number of languages spoken vs. the language proficiency). A larger sample of participants and especially a sizeable group of monolinguals would be necessary to ascertain whether the link between mastery of multiple languages and lower IoU can be replicated. It would also be important to have more participants with various educational backgrounds. While we acknowledge that in this study participants were highly educated, it is not uncommon for multilingual individuals to have advanced degrees (Wilson & Dewaele, 2010). Another relevant point is that in our data, the difference in scores on the IUS-12 between groups was driven by knowing only one language vs. knowing a second language (L2) in addition to a mother tongue. Thus, it is possible that it is perhaps not so much knowing extra languages but knowing more than one language that results in lower IoU.

In this study we also hypothesized that the experience of living in a foreign culture would be related to lower IoU (H2). It was found that having lived abroad for an extended period of time resulted in having significantly lower scores on the IUS-12 compared to having no experience abroad; however, not in comparison with a short time spent abroad. This finding echoes other observational and experimental research showing that living abroad has cognitive benefits, in that it boosts openness to experience (Zimmermann & Neyer, 2013) and creativity (Maddux & Galinsky, 2009). On the other hand, it is possible that people who already have high levels of trait openness are more likely to pursue international experiences compared to those who are lower in openness.

Finally, in line with the literature on IoU (Carleton et al., 2012), we found that with increasing age, scores on the IUS-12 decreased, thus, older individuals, on average, tended to be lower in IoU. However, it should be noted that in Carleton et al. (2012), the correlation between age and the IoU was negative but it did not reach the threshold to be considered significant. Overall, our results indicate that advanced age may make one less averse to uncertainty.

Conclusion

The current study is the first one to demonstrate that people who know several languages and use them proficiently can tolerate uncertainty better (i.e. they have lower Intolerance of Uncertainty scores). This entails that multilinguals have less aversion towards the unknown compared to people who speak fewer languages. People who are unable to cope with uncertain situations exhibit excessive levels of worry that eventually may lead to anxiety. We also show that the multicultural experience, i.e. having lived abroad for an extended period of time, is a factor that leads to lower Intolerance of Uncertainty. More research, however, especially more experimental studies will be necessary to uncover the effects of multilingualism that translate into benefits on mental well-being.

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