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Are we better liars in other languages? - A comparison of emotional activation during lying in a native and foreign language in Czech/English bilinguals.

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Contents:

Abstract

Lying and dishonesty were, is and very possible still will be in future, tied up with humankind. The craft of lying is a natural part of human development. Alongside with our early cognitive development, people are getting better and more sophisticated at telling lies (Fu, Sai, Yuan & Lee, 2017). However, the connection between lying and bilingualism is not yet very well researched. The study of Costa et al. (2014) is suggesting that people's morals and moral decisions are depending on what language (native or non-native) we are speaking or receive information in. Furthermore, there is evidence which are suggesting that people tend to be better liars in a non-native language because native language is associated with higher emotionality (Caldwell-Harris, 2014). In the present study, 13 participants who were either Czech (8 participants) or Slovak (5 participants) native speakers (9 females, 4 males) took part in the experiment which was aiming to find out whether people tend to be better and more convincing liars in their native language or in their second language. They were asked two questions (one in English, one in Czech) and they had to provide two answers, truth and lie. During answering the questions their biological responses (the skin conductance and heart rate) were measured by using BIOPAC, alongside with video recording the whole interview. Further three independent individuals were recruited as objective judges, to judge and observe lying traits of the video recordings of the participants. The statistical test provided one showed significant multivariate effect between the DVs and the phase (IV) ($p <. 001$). Further, the test did not provide any other significant results, thus did not support the hypothesis. However, the following outcomes from the independent judges supported the second hypothesis, as it was more difficult to differentiate between lie and truth when it was presented in the second language (English). It was caused by the fact that people tend to use less body language, gestures and facial expressions in the second language (English).

1. Introduction

What is lying?

Everyone has a different perception of what a lie or lying truly means. However, the definition from the Oxford dictionary describes it as *"a false statement made with the intention to deceive."* (OED, 1989). A similar definition can be found in the Webster's International dictionary (1907) where a lie is defined as *"a falsehood uttered or acted for the purpose of deception; an intentional violation of truth or an untruth spoken with the intention to deceive."* Definition by Ekman (2001) describes lying as an intentional act when a person wants to mislead another person. This act is deliberate, and there is no prior notification of the purpose. In addition, the target is not asked in advance. The person who is lying must put an extra effort into concealment and falsification of their statement. According to DePaulo and Jordan (1982), the main verbal strategies of lying are denial, omission, fabrication, evasiveness, nonresponsiveness, irrelevance and distortion.

In our history, present and very possible in our future, humankind is in close relationship with the craft of lying and dishonesty. According to psychologists (Fu, Sai, Yuan & Lee, 2017), from the Toronto University, the art of lying is a natural part of child development. Furthermore, the cognitive abilities of the child are one of the most important parts of the development of lying. Thus, children become better, more sophisticated and confident while lying with age. The study of Fu, Sai, Yuan & Lee (2017) is suggesting that there are many social contexts and various reasons and purposes why are children lying. However, it is well established that they are lying from a very young age of 2 years. However the reason, why it is happening is yet unknown (self-benefiting, personal gain,..).

Reasons for lying

Dishonesty and lying is something well known to everyone. People are lying for many reasons. One reason could be to boost their image. For example, Melissa Howard, who was a candidate for the Florida State House of Representatives, lied about her education. The scandal began, when she published her picture with her daughter and diploma with her name from Miami University of Ohio. Later, the University of Ohio reported they had no record of her graduating from their University (Garcia, 2018). Lying is very much tied up with the human kind, so much, that sometimes it is also a part of professional life. Such an example could be the pilots of small planes over Amazon rainforest. These pilots have to officially lie where are they flying because most landing strips are unofficial. These untruthful pieces of information might have disastrous consequences if the plane crashes, as nobody knows where to look for it (Whewell & Cruz, 2018). All of these scandals and many others suggest that lying is something, that humankind got adept to. People tell big or small lies on everyday basis. For example, in their professional lives, such as politician, doctors, pilots, ect., or in private lives, to friends, family, colleagues or children. However, this ability to adapt to lying so well together with the fundamental human need to trust each other, make it very difficult for people to recognize when one is lying.

Usually, lying tend to be considered as a defence mechanism, when one doesn't want others to know the truth. Thus, the most common kind of lie is the lie, which helps us to avoid punishment or any other negative consequences. (Ekman, 1997). However, the process of lying does not only include the lying itself, but also the effort to cover all the traits of the lying. So everyone accepts our lies as truth without any questions. This effort is called the interactive function of lying (Vybíral, 2008).

Furthermore, research which was done by Ekman (1997), was trying to find out why are people lying. This study came up with nine main motives of lying:

1. *To avoid being punished.* According to Ekman (1997), this is the most common reason for telling the lie by men and women, and further children as well.
2. *To obtain a reward, which would not be otherwise obtainable.* This is the second most frequently told lie (by adults and children). A good example is lying during a job interview to increase the chance of hiring.
3. *To protects another person from being punished.* This kind of lying is very common between family, friends or work colleagues.
4. *To protect oneself from the threat of physical harm.* This kind of lie is very different from the avoidance of the punishment, mainly because the person who is lying is protecting themselves from the threat of harm which is not caused by misdeed. For example, a child lying to a stranger behind the door, when home alone, that parents are sleeping, thus he or she can't open the door, and the stranger should come later.
5. *To get the admiration of others.* This involves lying about themselves to increase popularity or make specific people to like them. For example, pretending being interested in sort of hobby to make an impression on a stranger.
6. *To get out of an awkward situation.* An example of this kind of lie can be pretending there is an emergency at home to get out of the party.
7. *To avoid embarrassment.*
8. *To maintain privacy without notifying others of that intention.*
9. *To exercise power over others by controlling the information the target has.*

However, there are other distinctions of lies. One example can be to differentiate lies according to their intention, whether they cause profit or loss to one of the sides. Between these kinds of lies belongs: an altruistic 'white' lies, selfish 'black' lies and malicious 'black' lies. Where the 'white' lies bring the profit to both sides. Such a lie could be to tell a family member the meal was delicious when it was not. Thus, the family member will be happy and the person who said the lie will avoid any possible argument. The selfish 'black' lie is causing profit just to the person who is lying. And further, malicious 'black' lies does not bring profit to anyone (Erat, Gneezy, 2012).

Another lie distinction is dependent on how serious the lie is. According to the DePaulo (2004), the more serious lies mostly involve relationships, but also offences, or acts or situations which are disturbing, immoral, shameful, or illegal. Such as drug use, alcoholism or hidden pregnancy.

The research done by DePaulo (2004) came up and defined seven motives of lying. These seven motive were separated into three categories based on their seriousness. In the first category are lies which are said to cause their own benefits. These lies are trying to hide immoral or illegal decision and behaviours.

1. *Instrumental lies.* According to DePaulo (2004), these kinds of lies are the most common, and also, the most serious. An example can be lying about having an affair.
2. *Lies which are serving to avoid punishment or / and guilt.* These lies are very often used by children towards someone with higher social status or authority. For example, a child telling their teacher they forgot their homework at home, to avoid bad grade.
3. *Lies concerning the alleged claim.* According to DePaulo (2004), these lied are very often used by women. A good example is an underages girl, whose parents forbid her

to go out with an older boy, but she goes and meets him anyway, and afterwards, she is lying about it.

In the second category are lies which are told because of psychological reasons. Such as avoidance of embarrassment, confrontation or any other kind of conflict. Furthermore, according to DePaulo (2004) lies which are intended to hurt someone, also belongs to this category.

4. *Lies, which are protecting the liar.* These lies are told for self benefit. For example, to hide our feelings or specific information. These lies are very similar to the instrumental lies.
5. *Lies, which are dealing with the identity of the liar.* DePaulo (2004) consider these lies as the second most serious.
6. *Painful / Hurtful lies.* These lies are told with the only intention to hurt someone. Usually in a relationship.

In the third category are lies which are told to protect other people (friends, family, children or coworkers).

7. *Lies to protect others.* These lies are said to protect someone from negative feelings. For example, lying about someone's death or illness.

Does lying dependently on age?

Lying is one of the cognitive abilities of a human, thus it is naturally developing throughout life from childhood (Fu, Sai, Yuan & Lee, 2017). People becoming better and more confident and sophisticated liars with age. During human development the topic and motive behind lying changes. For example, children are more likely to tell lies to authorities to avoid punishment or / and guilt (DePaulo, 2004). For example, they are lying about their homework. Adolescents tend to lie or hide facts and pieces of information from their parents, about their privacy or personal responsibilities (Darling, Cumsille, Caldwell and Dowdy, 2006). Further, there are evidence, that adolescents are spending their free time with activities which were forbidden by their parents, and then they are lying about them (Darling, Cumsille, Caldwell and Dowdy, 2006). These kinds of lies are called '*Lies concerning the alleged claim'* (DePaulo, 2004). During early adulthood, there is a significant decrease in these lies. However, further, in adulthood, people tend to focus on different kinds of lies. For example, lies in professional life, such as lying during a job interview. People lie in both private and work life.

Based on this evidence it can be concluded, that people's ability to lie develops with their age, as it is part of the cognitive process. Further, it can be said that people lie throughout their whole life. However, the motive and the topic of lies changes with age.

Lying and genders, is there a difference?

There are a few studies which were conducted to find out whether there is a difference in terms of lying between genders. For example, 2000 people participated in a poll (Brooke, 2015) which was done in the United Kingdom of Great Britain. The results of this poll are suggesting that women are lying more and more often than men. According to this study, four

out of five women are lying on a daily basis. In men, it was only two out of five. Furthermore, some of the women who participated in the poll admitted that sometimes they are lying up to 30 times a day. However, the main reason for so often use of these lies, is according to the women, that they do not want to hurt anyone's feelings. So they are using some kind of lies to make them feel better or not to hurt them in specific situations. The poll suggests that 55 per cent lied to ‘make someone feel better’ and 32 per cent lied because ‘they did not want to get into any trouble’. Moreover, women are more likely to lie about their weight, job or salary. Further, they tend to pretend and lie about hobby just to impress someone. However, according to this poll, women are very self conscious about the lies, and they admitted they would not lie if it would cause any serious troubles. Women lie the most to their friends (30 per cent). Very often is lying on social media or on professionals CVs (Brooke, 2015).

On the other hand, another survey argues the opposite. That men are lying more and more often than women. 2000 people participated in this poll. The results suggested that men are bigger liars. However, in different aspects than women in the previous poll (Brooke, 2015). According to this survey, men tend to lie the most to their partners (Hodgkin, 2017). Further, men are more likely to lie than women during business negotiations. The results suggest, that this is happening because of men being more competitive (Vinopal, 2018).

To conclude, considering the fact that the researchers have contradictory results, it can be said that it is unknown, whether men or women are lying more than the other. However, the results are suggesting that women tend to use more white lies than men. And man is lying more often in work environments. According to a study done by DePaulo, Kashy, Kirkendol, Wyer & Epstein (1996), women tend to address lies towards others. For example, they are lying because they don't want to hurt someone, or they want to avoid criticism. And men,

orient their lies to themselves. For example, they are lying about their qualities to look better in others eyes.

Biological responses to lying

Human body experience many changes when one is lying. The Autonomic Nervous System causes an increase of brain arousal level because of the response of the monoamine neurotransmitters (such as epinephrine [adrenaline], norepinephrine [noradrenaline], and dopamine) (Proverbio, Vanutelli & Adorni, 2013). These changes in brain chemistry cause other body changes. One of the changes is voice change, which can be recognized and detected by using the "voice stress analyzer" (Harnsberger, Hollien, Martin & Hollien, 2009). During this voice modulation, the person's voice changes in tone, length or other abnormalities which differ from normal speech (taking a longer pause between words, using unusual words or giving too many details). People who lie also tend to cover their eyes or mouth. Unusual or / and exaggerated gestures might also appear. Moreover, their body language and expressions might not be in correspondence with what they are saying (saying no but nodding head as yes). Dilation of the pupil of the eye might be also considered as a lying symptom. Further, the eye movement and their direction. In addition, a heart rate frequency changes together with increased respiration. Equally important are the changes in electrodermal responses (a skin conductance changes). However, these changes are reflecting more the emotional state of the person, rather than cognitive. (Proverbio, Vanutelli & Adorni, 2013). Researches Harris, Ayçiçeği, and Gleason (2003) conducted a study where they were measuring the skin conductance responses of Turkish-English bilinguals. The results suggested that higher skin conductance response was found when taboo words presented in a native language (either visually or aurally) than in non-native language.

Equally important are the changes in the brain itself, which can be detected by neuroimaging. The frontal lobe is activated when one is suppressing the truth. When one is experiencing anxiety caused by the lying, it activates the limbic system. Further, the research of (Yang et al., 2005) suggests that liars have reduction (36% - 42%) in prefrontal grey matter and increase (22% - 26%) in prefrontal white matter. These findings suggest that it is easier for them to make connections between a variety of memories, thoughts and ideas.

Emotions and lying

Emotions play a very important role in the process of lying, however, the kind of emotion people are experiencing during the lying, depends on the kind of lie they are saying. Lying is a very difficult cognitive process because one needs to focus a lot on the topic. Hence, it is very difficult to quickly and confidently react to questions or other stimuli. For example, it is very difficult to look into someone's eyes while lying (Vrij a Bush, 2000). The emotions, one might experience during lying can be for example fear, that they will get caught. Also, someone can feel guilty because of their lies. Furthermore, they can also experience excitement and happiness at the moment when they find out or think people believed them. These emotions are influencing the behaviour. According to the study of Vrij, Edward and Bull (2001) these emotions are not only dependant on the circumstances and environment, but also on the personality of the person who is lying. Thus, some people might experience big stress and anxiety, because they are feeling very guilty to lie someone. And on the other hand, someone can lie on an everyday basis without any feelings of guilt, fear or stress.

By the same token, very important is the relationship we have with the person we lie to. There is evidence that people are more confident and find it much easier to lie to

strangers, as there is no emotional connection. Lying to friends, or family, or people close to us in general, is more difficult, because of the emotions we feel towards them (DePaulo a Kashy, 1998)

How to detect lies

One of the very important parts of the study of lying is to find out how to detect lies. According to Vrij et. al. (2004), there are three main categories, based on which, one can recognize a liar. The first category can be considered the behaviour of the person who is telling the lie. For example, a distinctive smile or laugh, gestures, body language, speed of the speech or intonation. The second category is about content of the lie (what is the person actually saying). People who are telling the lies usually tend to provide unnecessary details about the topic or their words and statements contradicts. The third category according to Vrij et. at. (2004) are the physiological responses. For example, the skin conductance, heart rate or respiration. Further research of Vrij (2008) provided evidence that people ability to recognize lie from the truth, is between 31% to 68%. However, people tend to be less accurate while recognizing the truthful statements.

Furthermore, it was proven that it is beneficial for people (judges in case of this study) who are supposed to differentiate between truth and lie, to get instruction about what they should look for (lying traits). The study of DePaulo, Lassiter and Stone (1982) conducted a study in which 44 participants had to decide whether the people on video recording are telling the truth or not. Half of the participants were instructed to especially pay attention to the voice intonation. The other half did not get any instructions. The results suggested that the participants who received the instructions, were significantly more successful, that those

without. Further analyses showed that the focus on the voice intonation increased the ability to correctly mark truthful statements, nevertheless, it did not increase the recognition of lies.

A very important role in detecting liars are emotions. It was proven, that the motivation of the liar is crucial. The fact that a person is under a huge amount of stress, because of the fear of being caught lying, make people more vulnerable, thus more emotional. This emotionality leads to behaviour and physiological changes, which can lead to easier lie detection (Vrij, 2008).

Furthermore, the cognitive load which the person who is lying experiencing can decrease their memory. Thus, this person can very easily forget their previous lies, thus they can be caught (Ekman, 1997). Moreover, the content of the lies can also reveal the truth. Untruthful statements are usually contradictive, complex and also usually very negative (Newman et. al., 2003).

Vrij (2008) also describes traits such as movements which are connected to lying. For example, unusual hand movements, walking around, shifting eyes around the room, not being able to keep eye contact. These so-called lying traits are connected to the fact the person is experiencing stress and anxiety (Vrij, 2008).

The connection between bilingualism and emotions

Language studies are usually done on monolingual subjects, thus the connection between bilingualism and emotions is not very well researched yet. However, there have been some suggestions that many bilinguals feel stronger emotional arousal when words or situations are presented in their native language, than if it is presented in their non-native language (Dawaele, 2004). There also has been a piece of evidence that people experience bigger anxiety in native language than in non-native language, when taboo words are

presented (Gonzales-Reigosa, 1976). The study of Bond & Lai (1986) provided further evidence that people feel more comfortable and confident to talk about embarrassing topics in non-native language than in native. Thus, people are less or not embarrassed at all to talk, for example, about sexual experiences or attitudes, events when they embarrassed themselves or private health problems. The reason why they feel less embarrassed, hence more comfortable and confident in a non-native language, is that fact that they are more emotionally distant from that situation. The situation is more artificial.

Lying in a native and a non-native language

Lying is closely tied up with morals and values, which means being able to judge what is 'wrong' and 'right'. It is believed that these judgments came from the deep and thoughtful process and thus they should not be affected by any other variables. However, the study of Costa et al. (2014) found that people's morals and decisions vary depending on whether the situation is presented in a native language or non-native language. In their study, they presented a scenario, where the participants had to imagine that they are standing on a footbridge which is over a train track. There is a train which is about to kill 5 people. The only way how they can stop the train is to push a heavy man off the bridge. Thus, they have to actively kill a man to save 5 other people. The results showed that more than half of the participants, across all populations (English/Spanish, Korean/English, English/French, and Spanish or English/Hebrew) choose to save 5 people by actively killing one man when the situation was presented in a foreign language than in native language. The second experiment by Costa et al. (2014) was much less emotional. The scenario was very similar to the previous, but to save the five people, they had to pull a switch to redirect the train on another track, where there was just one person. According to the result, more people were willing to

kill one person by pulling the switch than actively push a man from the bridge like in the previous experiment. The language (native or non-native) did not affect the decision as there were no significant differences.

The findings of the study suggest that the emotional response is reduced when a foreign language is used (Costa et al., 2014). This phenomenon can be explained by the cognitive load which massively increases when a foreign language is used. There is evidence that when the cognitive load (Greene, Morelli, Lowenberg, Nystrom & Cohen, 2008), or stress (Youssef et al., 2012) is present (anxiety from the use of foreign language), the emotional and moral part of the judgment is reduced.

According to the psychologists, Manon Jones from the University of Bangor and Ceri Ellis from University of Manchester bilingual or multilingual people tend to report different feeling while using native or non-native language. Their research suggests that language learning is closely linked to experiences. Hence, the native language is more emotional, because it is learnt from early childhood, it is connected to home, family, friends and all fundamental emotions. Thus, we process the information in the native language more emotionally than in the second language. Non-native languages are usually learned in a very artificial environment, such as school, language courses. It is a more logical process, people use books, slides, phrase books or recordings to learn the language. Hence, the processing of non-native language is less emotionally connected. For this reason when someone says to Czech native speaker ‘I love you.’ it might mean less or nothing compared to when it is said in the Czech language ‘Miluji Tě.’ when the person would probably smile and blush.

A study conducted by Kristina Suchotzki and Matthias Gamer (2018), of the University of Würzburg in Germany, supports the hypothesis that bilinguals tend to be better liars in their second, non-native language. According to Suchotzki & Gamer (2018), the

native language is, indeed, more emotionally connected than non-native language. The emotionality makes people more vulnerable when telling lies in the native language. This so-called emotional disconnection in a non-native language can be caused by the fact that the second language is more logical and is associated with more rational thinking. The non-native language is usually artificially learnt via books or recordings in a school environment. This artificial environment makes the second, non-native language more distant from emotions, thus people are more disconnected from what they are talking about in their second language. And this disconnection is what make telling the lies in non-native language easier (Suchotzki & Gamer, 2018)

The present study

The aim of the present study is to investigate, on the sample of Czech or Slovak natives speakers with English as their second language, whether they are better liars in their second language than in their native. To support this theory, there is a lot of evidence that native language triggers more emotional reactions than foreign language (Pavlenko, 2005; Opitz, Degner, 2012; Dawaele, 2004; Caldwell-Harris, Ayçiçeği-Dinn, 2009). The lowered emotionality during the use of non-native language is causing reduced biological reactions (Harris, Ayçiçeği, Gleason, 2003). The skin conductance is reduced while presenting emotional statements, or scenarios in a foreign language compared to a native language (Harris, 2004; Costa, Foucart, Arnon, Aparici, Apesteguia, 2014). Hence, this study is going to use the skin conductance and heart rate measurement to detect the emotional responses during lying in a native and a non-native language.

Aim

Based on an excessive amount of evidence presented, the aim of this study was to examine whether people tend to be better liars in their second, non-native language (English) than in their first, native language (Czech or Slovak). Hence, there would be higher biological responses (the skin conductance response and heart rate) when lying in a native language. Further, it would be more difficult to judge and recognize if the person lying when speaking in a non-native language (English) than in native language (Czech or Slovak).

Hypotheses

Hypothesis 1: There are going to be higher biological responses (the skin conductance response and heart rate) when lying in a native language.

Hypothesis 2: It is going to be more difficult to judge and recognize whether is a person lying or telling true in a non-native language.

2. Methodology

Participants

There were 13 participants taking part in the study, where the main aim was to find out if people tend to be better and more convincing liars in their native language or in their second language. The sample consisted of 9 females and 4 males. All participant were current

or former students of the University of South Wales. All participants were recruited based on the fact that their native language was Czech (8 participants) or Slovak (5 participants), and their second, non-native, language was English. Age or any other personal details were not collected in this study.

In addition, 3 independent individuals were recruited as objective judges, to judge and observe lying traits of the video recordings of the participants.

Materials

Participants were provided with either the task sheet A (Appendix 1) or task sheet B (Appendix 2) which was in prior prepared by the experimenter. The task sheet contained two questions, one question was in Czech language and one in English. The order of the language was depending on whether participants received task sheet A or B. Participants received this task sheet to prepare and remember their both truthful answers and their lies. In addition, a list of additional questions was prepared in both languages (Appendix 3). These questions were used during the interview to surprise the participants.

Furthermore, a BIOPAC was used in order to find out if there are significant changes in heart rate and skin conductance of the participants during answering the questions.

Equally important, a camera was used in order to video record the whole interviews for later use. Further, the video recordings were cut and edited in Movie Maker and later on presented to independent and objectives judges.

Design

In order to test hypotheses, 2x2x2 design statistical test was conducted. To avoid the order effect, all participant were assigned to either group A, where they were first answering

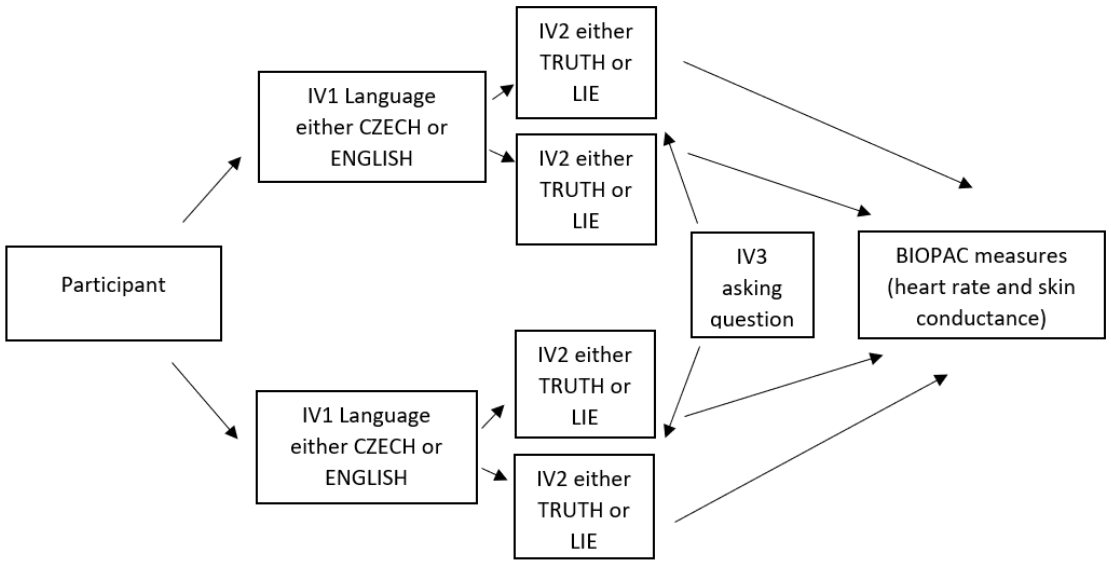
in Czech, or group B, where the first language was English. In addition, participants draw if they will lie or telling truth first.

A series of multivariate ANOVAs were conducted with six conditions as independent variables (IVs). In this 2x2x2 MANOVA statistical test the IV1 was the languages used (native [Czech or Slovak] and second [English]), IV2 was the condition if they were lying or telling the truth, and IV3 was the phase when they were asked additional questions (either during lying or telling truth). The dependent variable (DV) was the heart rate and skin conductance data collected from BIOPAC.

This statistical test was used in the order to find a significant difference between lying or telling truth in a native language (Czech or Slovak) or in a second, non-native language (English).

In the next stage, three independent and subjective judges watched the video recordings of participants above. Their task was to observe and find traits connected to lying, in order to say what is correct and what is a lie.

Figure 1: The design of the study.



Procedure

Prior to the interviews task sheets and all the questions were created by the experimenter.

Czech and Slovak natives with English as the second language were invited to face to face interviews in a laboratory environment. After their arrival, they received a clear explanation of the tasks they need to do. In addition, they received an informed consent form, the information sheet and information sheet about the BIOPAC. Participants have been given time to asked any question before the experiment began, to make sure they are feeling comfortable and they do understand everything correctly. After mutual agreement participants were connected to the BIOPAC. Furthermore, the participants received 2 questions (one question in each round) on either task sheet A or on task sheet B, for which they needed to prepare a false and correct answer. To prevent the order effect of the results, the task sheet A had the first question in Czech and the second question in English, task sheet B reversely. Furthermore, participants draw if they will be saying the truth or lie first, before each round. Before the experiment started, participants received 5-10 minutes to prepare and remember their answers.

In the first round, they were asked to make up a story about a school they went before university. The false answer needed to be very different from the real one. Then they had to tell 2 versions of the story - truth and lie. As already mentioned above, to counterbalance their answers, they draw a piece of paper which indicated if they had to first tell the truth or lie. During or after they described the school they went before they attended university, the experimenter asked them some additional questions for the story each version. In the second round, the participants were asked to make up a story about a city/village/ countryside they grew up in. Then it followed the same procedure as in the first round.

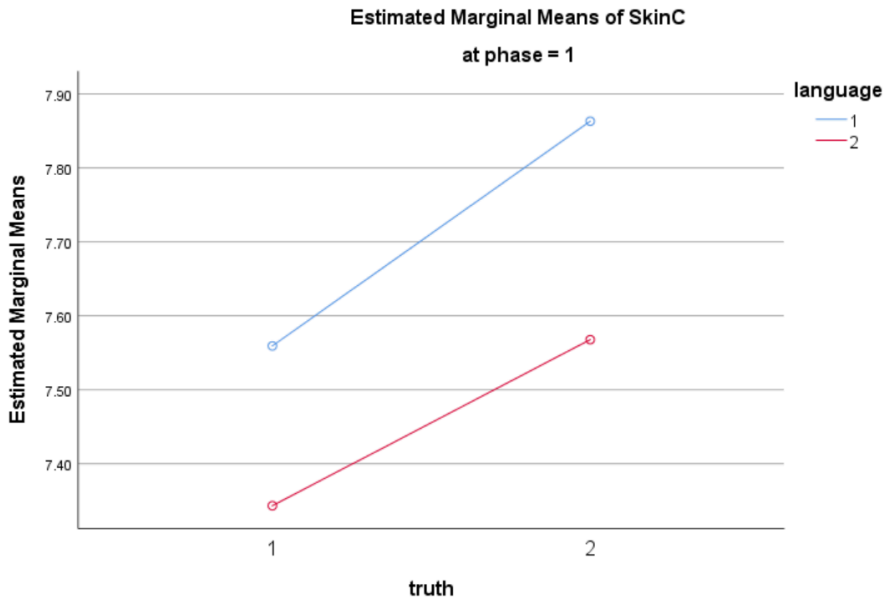
During the interview, they have been video-recorded and also, during this part, participants were connected to BIOPAC where their physiological responses (heart rate and the skin conductance response) were measured. When the experiment ended the participant received a debrief form.

After the interviews were done, all of the videos were presented to 3 objective and independent members of the researcher team. They observed traits connected to lying, to judge if the person on the video is indeed lying or not.

3. Results

The MANOVA statistical test examined the heart rate and skin conductance (DVs), and the language (native or non-native), phase (asking questions during their made up or truthful story, or the condition of telling the truth or lie (IVs). The MANOVA examined associations between these IVs and DVs described above. The results showed significant multivariate effect between the DVs and the phase (IV), where the Wilks' $\lambda = .241$, F (2, 11.000) = 17.298, p <. 001. Furthermore, the univariate analyses of the heart rate (DV) and phase (IV) also showed a significant difference (df = 1, F = 35.847, p<.001). However, the interaction between other IVs were not significant.

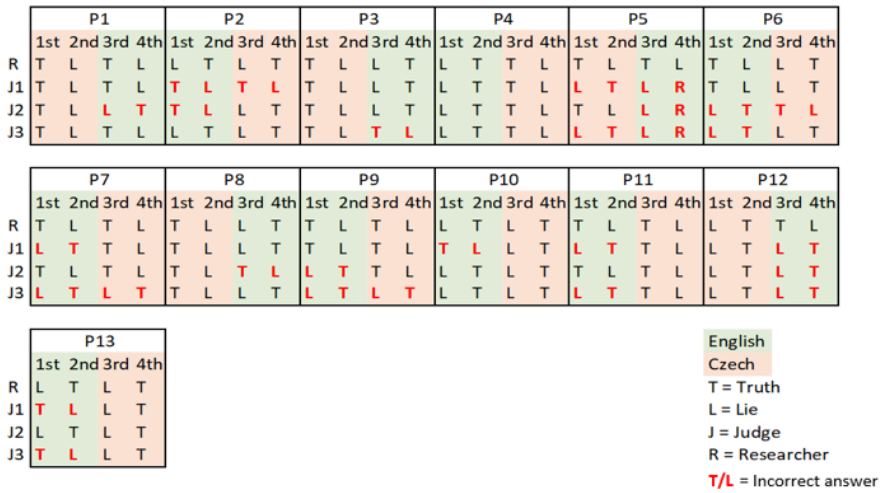
Figure 2: The interaction between the skin conductance response, language and the truth condition during a phase one



In the next stage, further qualitative analysis supports the hypothesis. All three judges agreed on the fact that participants were harder to read when speaking in the second language (English) than in their native language (Czech or Slovak). According to the independent

judges, participants tend to use more body language, gestures and facial expressions while speaking in their native language. As an example, judges stated that the participants tend to make more gestures while speaking Czech. Furthermore, they tend to make more gestures while lying, as predicted. Thus, according to the independent judges, it was easier to recognize lie from the truth in a native language (Czech or Slovak) than in the second language (English) (Viz Figure 3). The lying traits which were identified by the judges, while lying were: distinctive smile or laugh, often also very nervous smile, which was very different from the smile or facial expression while telling the truth. Equally important was the eye contact. The participants were avoiding the eye contact or shifting around the room when they were telling the lie. Overall the gestures, facial expressions or body language was harder to read while using a second language (English), thus judges were struggling with distinguishing between truth or lie. According to the judges it was harder to distinguish if the participant is lying or telling the truth in their second language (English), as their behaviour and body language were not as lively as in native language (Czech or Slovak).

Figure 3: Results from the independent judges



	P1				P2				P3				P4				P5				P6			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
R	T	L	T	L	L	T	L	T	T	L	L	T	L	T	T	L	T	L	T	L	T	L	L	T
J1	T	L	T	L	T	L	T	L	T	L	L	T	L	T	T	L	L	T	L	R	T	L	L	T
J2	T	L	L	T	T	L	L	T	T	L	L	T	L	T	T	L	T	L	L	R	L	T	T	L
J3	T	L	T	L	L	T	L	T	T	L	T	L	L	T	T	L	L	T	L	R	L	T	L	T

	P7				P8				P9				P10				P11				P12			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
R	T	L	T	L	T	L	L	T	T	L	T	L	L	T	L	T	T	L	T	L	L	T	T	L
J1	L	T	T	L	T	L	L	T	T	L	T	L	T	L	L	T	L	T	T	L	L	T	L	T
J2	T	L	T	L	T	L	T	L	L	T	T	L	L	T	L	T	T	L	T	L	L	T	L	T
J3	L	T	L	T	T	L	L	T	L	T	L	T	L	T	L	T	L	T	T	L	L	T	L	T

	P13			
	1st	2nd	3rd	4th
R	L	T	L	T
J1	T	L	L	T
J2	L	T	L	T
J3	T	L	L	T

English
Czech
T = Truth
L = Lie
J = Judge
R = Researcher
T/L = Incorrect answer

4. Discussion

Summary of the findings

This study was investigating whether people are better liars in their second, non-native language than in their first, native language. Where the first hypothesis was, that the biological responses, such as skin conductance response and heart rate, will be significantly lower when lying in a second, non-native language (English). The second hypothesis was, that it will be more difficult to recognize if the person is lying or telling truth in the second language, based on their body language. The results of the 2x2x2 MANOVA statistical tests suggested one significant multivariate effect between the skin conductance response (DV) and the phase (IV) (Wilks' $\lambda = .241$, F (2, 11.000) = 17.298, $p <. 001$). This result suggests that the biological response (the skin conductance) was reduced while telling the truth in English (non-native language) compared to telling the truth in Czech or Slovak (native language). This partially supports the hypothesis that the participants are less emotional in a non-native language, thus their biological responses are reduced. However, overall the results of the statistical test did not support the hypothesis.

However, further qualitative outcome supports the hypothesis that it was, indeed, more difficult to judge and decide whether the person is lying or telling the truth in a second, a non-native language. Overall, all the judges agreed on the fact that participants were using more gestures, facial expressions and body language while speaking in the native language. Moreover, as predicted, they also used more body language while telling the lie compared to telling the truth. The judges stated that it was much easier to tell the difference between lie

and truth in Czech or Slovak (native language) than in English (non-native language). According to the judges, the participants seemed to be more nervous while telling lies, especially in Czech or Slovak language (native). Further, they identified traits which could be connected to lying behaviour. A first example was a nervous or very distinctive smile or laugh, which was very different from the facial expression while telling the truth. Next trait was the eye contact. The participants tend to either avoid the eye contact completely or shift around the room while lying. Again it was more noticeable while speaking Czech or Slovak (native). Further, their gestures and body language were more expressive while speaking in the native language. Participants were more lively as they were interacting with the true memories. They were moving hands, moving their whole body on the chair. All the judges agreed on the fact that it was much more difficult to differentiate whether the person on the recording is lying or not when speaking in a non-native language, because of their body language, gestures and facial expressions were not as lively as in native language.

Explanation of the findings

The qualitative outcome did support the second hypothesis, as all the judges agreed on the fact that it was more difficult to tell when the participant is lying and when they are telling the truth in a non-native language (English). When people are lying, they need to put an extra effort into it. They tend to use contradicting words, distortion, evasiveness, denial, omission, fabrication, unresponsiveness and irrelevance (DePaulo, Jordan, 1982; Newman et. al., 2003). The results of these studies were in correspondence with this statement as the judges confirmed these verbal traits. The participants did use these verbal traits, thus it was easier to differentiate between the truth and lie. Moreover, according to the judges, there was also a noticeable change in voice modulation (Vrij et. al., 2004). However, these verbal lying

traits were much noticeable in the native language, as the participants probably experienced more of an anxiety and stress. Further, the body language, facial expressions and gestures were more visible when the native language was used. This is in correspondence with the previous research of Vrij (2008), which proves that people who lie tend to be more physically active. These physiological changes (such as unpredictable movements, a distinctive smile, hand movements) are also caused by the big amount of stress and anxiety, which is caused by the lying process. Further, the fact that these changes were more noticeable in native language (Czech or Slovak), are in correspondence with the evidence, that people tend to be less emotional in non-native languages (Costa et. al., 2014, Youssef et al., 2012), All of these changes have been responses to the emotions the participants were experiencing while lying. Moreover, there is a piece of many evidence that emotional activation is reduced when using a foreign language (Dawaele, 2004; Gonzales-Reigosa, 1976).

The 2x2x2 MANOVA statistical test found only one significant multivariate effect between the skin conductance response (DV) and the phase (IV) (Wilks' $\lambda = .241$, F (2, 11.000) = 17.298, $p <. 001$). This outcome suggested that there was a reduction of biological responses while using non-native language (English) compared to native language when telling the truth. Which is supported by many previous investigations (Proverbio, Vanutelli & Adorni, 2013; Harris, Ayçiçeği, and Gleason, 2003). However, there were no other significant effects within the IVs and DVs. One possible explanation could be that the participants were not fluent enough in their second language (English). Hence their biological reactions were caused by the stress or anxiety reaction to speaking in a foreign language, not by the emotions triggered by the lying itself. At the other hand, one could argue that students attending British university should have a good knowledge of the English language.

Advantages of the present study

One of the biggest advantages of this research should be considered the fact that it had both quantitative and qualitative design. The quantitative part was measuring the heart rate and the skin conductance. Hence, the BIOPAC was used as a 'lie-detector'. However, the biological measures are not very accurate (only in 56% of cases) (Patrick, Iacono, Schmitt, 1989). And that is the reason why the research should not solely depend on them. For that reason, the qualitative part was implemented. The knowledge of lying traits which were described in previous researches (Vrij et. al., 2004; Vrij, 2008), together with the further knowledge of the lying motives (Ekman, 1997; DePaulo, 2004), made it easier to differentiate between the truth and lie. To conclude, the mixture of quantitative and qualitative design adds on its validity, as other variables are considered. Further, the fact that this research was conducted as a within participants design was a big advantage as well. All the participants were lying and telling the truth in both languages, thus they were their own control group.

Limitations of the present study and future research suggestions

There can be found a few limitations in this study. Firstly, there is a possibility that the physiological measurements are not as accurate as it was predicted. One example can be the use of lie-detectors. A study which was done by Patrick, Iacono, Schmitt (1989), where the main aim was to find out the accuracy of the biological measurements came out with results, that the lie-detectors were precise in only 56% of cases. Further the fact that other variables might have caused the increase of the skin conductance responses and heart rate, during lying in a foreign language. For example, distracting elements in the environment (hearing noises

from outside or next room, very high temperature in the room). Furthermore, the participants might have experience mild stress or anxiety while speaking in a foreign language. They could have experience fear of talking in English (difficult to find the correct words), or not being able to understand what the experimenter is asking about. Alongside with the research of Costa et al. (2014) which suggest that emotional response is reduced when someone is speaking or receiving pieces of information in foreign language, and this is caused by the sudden massive increase of cognitive load the person is experiencing while speaking foreign language (Greene, Morelli, Lowenberg, Nystrom & Cohen, 2008). This cognitive load together with stress or anxiety (Youssef et al., 2012) reduce the emotional and moral part of the judgment. Thus, according to all this evidence, the biological responses (the skin conductance and heart rate) should be lowered as there is a low emotional connection. However, the symptoms of anxiety or stress itself have increased heart rate, respiration and the skin conductance response. Thus, the non-significant result could be caused by the fact that participants experienced stress and anxiety because they had to use a foreign language, and possible because they have been video recorded. And not because of the stress or other emotional response they would usually provide while lying.

This experiment was conducted in the laboratory environment. This fact might be one of the limitations as well. The main reason for the use of laboratory environment was to make sure no other variables are disrupting the data collection. But, in this specific case, there have been noises from outside and from the next rooms presented. Further, the high room temperature also could have affected the participants in a negative way, thus affect the results. However, the fact that the laboratory environment was used, make the reactions of participants less ecologically valid, as the environment did not match the real-life condition. This extra pressure, caused by artificial conditions, might have also negative effects on the

participants' behaviours. Hence, the results might have been affected, which resulted in non-significant findings.

Another possible limitation could be the questions which were asked during the interview. They possibly did not trigger an emotional reaction as was predicted. Thus, different questions or topics could be considered for further research. One idea could be the use of questions which are somehow connected to the history of the country. For example, in the sample of Czech native people, to ask them questions about the Second World War, as this topic is very tied up with the history of the Czech Republic. Hence, it might trigger stronger emotions. Next possible option would be to ask more personal questions to trigger more and stronger emotional reactions. However, one could argue it would not be ethical, to ask or talk about very personal topics. Also, there is a possibility this kind of experiment would cause bigger distress and anxiety in participants.

Another possible limitation could be the fact, that the independent judges, who were judging whether the participant on the video recording is lying or not, were only females. According to Anderson, DePaulo, Ansfield, Tickle and Green (1999), the fact that there was no male judge, could make a possible difference within the result. The reason for this is that women tend to focus on the visual part of lying while judging. Thus, they are focusing more on the gestures, body language, voice intonation, etc. On the other hand, men focus on the verbal part of lying. They are focusing more on the content of the lie, rather on the visual part (Anderson, DePaulo, Ansfield, Tickle & Green, 1999). Thus, future research might consider using an equal number of both genders. This would help to the fact that both areas (verbal and visual) are covered. Hence, the outcome would be more ecologically valid.

Furthermore, a larger sample of participants should be considered to get more precise results within the statistical test. The sample of 13 participants, which was used in this study,

was possibly the reason for non-significant results. Moreover, recruiting participants from a different background (bilinguals from more countries, not only from the Czech Republic or Slovakia) should be also considered. Thus, do not interview only university students or university graduates, but the more diverse environment and possibly in different age categories, to achieve a more ecologically valid result.

5. Conclusion

To conclude, based on the extensive evidence from previous researchers and part of the results of the present study, the choice of language (either native or non-native) do have an effect on our ability to lie. People find it more difficult to recognize whether the person is indeed lying or telling the truth when speaking in a foreign language. This assumption is based on the fact that the body language, gestures and facial expressions are not as lively as if the person would speak in the native language. Further, people are more confident to tell lies in a foreign language. This is happening because the person is more emotionally distant from the topic they are lying about. However, the biological responses should be further researched as there can be many variables affecting them, such as stress caused by the use of language itself.

There is slowly expanding literature related to the connection between bilingualism and lying. However, there it is still a lot to be researched in future. These future finding could be very beneficial in other scientific fields, not only psychology. The understanding of the connection between bilingualism and lying could be very helpful within forensic science or police.

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7. Appendixes

Appendix 1. Task sheet A

Appendix 2. Task sheet B

Appendix 3. Additional questions in both languages

Appendix 4. The within participant 2x2x2 MANOVA statistical results

Appendix 1. Task sheet A

Task Sheet A - 1st Czech language and 2nd English language

Round 1.
Vyprávěj mi o škole kterou jsi navštěvoval/a před tím než si nastoupila na University of South Wales.

Pravda Lež

Round 2.
Tell me a story about the City/Village/Countryside you grew in?

Truth Lie

Appendix 2. Task sheet B

Task Sheet B - 1st English language and 2nd Czech language

Round 1.
Tell me a story about the school you went to before university?

Truth Lie

Round 2.
Vyprávěj mi o městě/vesnici kde jsi vyrostl/a?

Pravda Lež

Appendix 3. Additional questions in both languages

Round 1.
Tell me a story about the school you went to before university?

CZECH

1. Kolik pater měla ta škola? Byl tam výtah?
2. Měla Vaše škola školníka nebo školnici?
3. Měli jste zahradu? Sportovní hřiště?
4. Zvonilo vám? Nebo jste museli stále hlídat čas na hodinách?
5. Byla u Vás ve škole školní kantýna? Co jsi si tam nejčastěji kupoval/a?
6. Měla Vaše škola ředitele ředitelku?
7. Měla Vaše škola plavecký bazén?
8. Kolik vás bylo ve třídě? Víc holek nebo kluků?

ENGLISH

1. How many floors did the school have? Did the school have an elevator as well?
2. The janitor of the school was man or woman?
3. Did the school have a garden? Sports areal?
4. Did the school bell ring at the beginning and end of your classes? Or did you have to look at the clock all the time?
5. Did you have school cafeteria? What was the thing you were buying there most often?
6. The principal of the school was man or woman?
7. Did you have a swimming pool at your school?
8. How many people were in your class? More girls or boys?

Round 2.
Tell me a story about the City/Village/Countryside you grew in?

CZECH

1. Kolik škol bylo ve tvém městě?
2. Měli jste ve městě tramvaje?
3. Nějaká významná památka v okolí? Hrad?
4. Je tam kino nebo divadlo?
5. Kolik přibližně obyvatel žilo v tom městě?
6. Je tam nějaká řeka? Jezero?
7. Je tam koupaliště? Aquapark?
8. Je tam nějakej zimní stadion?
9. Je tam nějaký hezký park?

ENGLISH

1. How many schools were there?
2. Did you have trams in your city?
3. Any famous monument? Castle?
4. Is there cinema and theater?
5. What is roughly the population thee?
6. Is there some river? Lake?
7. Is there a swimming pool? Aquapark?
8. Is there an ice ring?
9. Is there some nice park?

Appendix 4. The within participant 2x2x2 MANOVA statistical results

Within-Subjects Factors

Measure	language	truth	phase	Dependent Variable
HR	1	1	1	CzechT
			2	CzechTQ
		2	1	CzechL
			2	CzechLQ
	2	1	1	EnglishT
			2	EnglishTQ
		2	1	EnglishL
			2	EnglishLQ
SkinC	1	1	1	SkinCzechT
			2	SkinCzechTQ
		2	1	SkinCzechL
			2	SkinCzechLQ
	2	1	1	SkinEnglishT
			2	SkinEnglishTQ
		2	1	SkinEnglishL
			2	SkinENglishLQ

Descriptive Statistics

	Mean	Std. Deviation	N
CzechT	96.5462	14.02917	13
CzechTQ	88.2462	11.92083	13
CzechL	96.3815	15.02923	13
CzechLQ	90.0269	12.74558	13
EnglishT	96.7000	14.86703	13
EnglishTQ	89.3431	13.98915	13
EnglishL	100.3254	15.65207	13
EnglishLQ	92.5015	14.44041	13
SkinCzechT	7.5592	5.20793	13
SkinCzechTQ	7.3977	5.25018	13
SkinCzechL	7.8631	5.31682	13
SkinCzechLQ	7.7331	5.27938	13
SkinEnglishT	7.3431	5.01371	13
SkinEnglishTQ	7.2423	5.07380	13
SkinEnglishL	7.5677	5.44462	13
SkinENglishLQ	13.4100	21.55141	13

Multivariate Tests[a]

Effect			Value	F	Hypothesis df	Error df	Sig.
Between Subjects	Intercept	Pillai's Trace	.982	301.621[b]	2.000	11.000	.000
		Wilks' Lambda	.018	301.621[b]	2.000	11.000	.000
		Hotelling's Trace	54.840	301.621[b]	2.000	11.000	.000
		Roy's Largest Root	54.840	301.621[b]	2.000	11.000	.000
Within Subjects	language	Pillai's Trace	.199	1.364[b]	2.000	11.000	.296
		Wilks' Lambda	.801	1.364[b]	2.000	11.000	.296
		Hotelling's Trace	.248	1.364[b]	2.000	11.000	.296
		Roy's Largest Root	.248	1.364[b]	2.000	11.000	.296
	truth	Pillai's Trace	.207	1.435[b]	2.000	11.000	.279
		Wilks' Lambda	.793	1.435[b]	2.000	11.000	.279
		Hotelling's Trace	.261	1.435[b]	2.000	11.000	.279
		Roy's Largest Root	.261	1.435[b]	2.000	11.000	.279
	phase	Pillai's Trace	.759	17.298[b]	2.000	11.000	.000
		Wilks' Lambda	.241	17.298[b]	2.000	11.000	.000
		Hotelling's Trace	3.145	17.298[b]	2.000	11.000	.000
		Roy's Largest Root	3.145	17.298[b]	2.000	11.000	.000
	language * truth	Pillai's Trace	.188	1.270[b]	2.000	11.000	.319
		Wilks' Lambda	.812	1.270[b]	2.000	11.000	.319
		Hotelling's Trace	.231	1.270[b]	2.000	11.000	.319
		Roy's Largest Root	.231	1.270[b]	2.000	11.000	.319
	language * phase	Pillai's Trace	.085	.513[b]	2.000	11.000	.612
		Wilks' Lambda	.915	.513[b]	2.000	11.000	.612
		Hotelling's Trace	.093	.513[b]	2.000	11.000	.612
		Roy's Largest Root	.093	.513[b]	2.000	11.000	.612
	truth * phase	Pillai's Trace	.094	.572[b]	2.000	11.000	.580
		Wilks' Lambda	.906	.572[b]	2.000	11.000	.580
		Hotelling's Trace	.104	.572[b]	2.000	11.000	.580
		Roy's Largest Root	.104	.572[b]	2.000	11.000	.580
	language * truth * phase	Pillai's Trace	.091	.551[b]	2.000	11.000	.592
		Wilks' Lambda	.909	.551[b]	2.000	11.000	.592
		Hotelling's Trace	.100	.551[b]	2.000	11.000	.592
		Roy's Largest Root	.100	.551[b]	2.000	11.000	.592

Univariate Tests

Source	Measure		Type III Sum of Squares	df	Mean Square	F	Sig.
language	HR	Sphericity Assumed	95.578	1	95.578	1.521	.241
		Greenhouse-Geisser	95.578	1.000	95.578	1.521	.241
		Huynh-Feldt	95.578	1.000	95.578	1.521	.241
		Lower-bound	95.578	1.000	95.578	1.521	.241
	SkinC	Sphericity Assumed	40.788	1	40.788	.698	.420
		Greenhouse-Geisser	40.788	1.000	40.788	.698	.420
		Huynh-Feldt	40.788	1.000	40.788	.698	.420
		Lower-bound	40.788	1.000	40.788	.698	.420
Error(language)	HR	Sphericity Assumed	754.089	12	62.841		
		Greenhouse-Geisser	754.089	12.000	62.841		
		Huynh-Feldt	754.089	12.000	62.841		
		Lower-bound	754.089	12.000	62.841		
	SkinC	Sphericity Assumed	700.848	12	58.404		
		Greenhouse-Geisser	700.848	12.000	58.404		
		Huynh-Feldt	700.848	12.000	58.404		
		Lower-bound	700.848	12.000	58.404		
truth	HR	Sphericity Assumed	114.660	1	114.660	2.684	.127
		Greenhouse-Geisser	114.660	1.000	114.660	2.684	.127
		Huynh-Feldt	114.660	1.000	114.660	2.684	.127
		Lower-bound	114.660	1.000	114.660	2.684	.127
	SkinC	Sphericity Assumed	80.344	1	80.344	1.432	.254
		Greenhouse-Geisser	80.344	1.000	80.344	1.432	.254
		Huynh-Feldt	80.344	1.000	80.344	1.432	.254
		Lower-bound	80.344	1.000	80.344	1.432	.254
Error(truth)	HR	Sphericity Assumed	512.612	12	42.718		
		Greenhouse-Geisser	512.612	12.000	42.718		
		Huynh-Feldt	512.612	12.000	42.718		
		Lower-bound	512.612	12.000	42.718		
	SkinC	Sphericity Assumed	673.078	12	56.090		
		Greenhouse-Geisser	673.078	12.000	56.090		
		Huynh-Feldt	673.078	12.000	56.090		
		Lower-bound	673.078	12.000	56.090		
phase	HR	Sphericity Assumed	1446.494	1	1446.494	35.847	.000
		Greenhouse-Geisser	1446.494	1.000	1446.494	35.847	.000
		Huynh-Feldt	1446.494	1.000	1446.494	35.847	.000
		Lower-bound	1446.494	1.000	1446.494	35.847	.000
	SkinC	Sphericity Assumed	48.267	1	48.267	.828	.381
		Greenhouse-Geisser	48.267	1.000	48.267	.828	.381
		Huynh-Feldt	48.267	1.000	48.267	.828	.381
		Lower-bound	48.267	1.000	48.267	.828	.381
Error(phase)	HR	Sphericity Assumed	484.220	12	40.352		
		Greenhouse-Geisser	484.220	12.000	40.352		
		Huynh-Feldt	484.220	12.000	40.352		
		Lower-bound	484.220	12.000	40.352		

	SkinC	Sphericity Assumed	699.265	12	58.272		
		Greenhouse-Geisser	699.265	12.000	58.272		
		Huynh-Feldt	699.265	12.000	58.272		
		Lower-bound	699.265	12.000	58.272		
language * truth	HR	Sphericity Assumed	43.396	1	43.396	1.733	.213
		Greenhouse-Geisser	43.396	1.000	43.396	1.733	.213
		Huynh-Feldt	43.396	1.000	43.396	1.733	.213
		Lower-bound	43.396	1.000	43.396	1.733	.213
	SkinC	Sphericity Assumed	53.784	1	53.784	.932	.354
		Greenhouse-Geisser	53.784	1.000	53.784	.932	.354
		Huynh-Feldt	53.784	1.000	53.784	.932	.354
		Lower-bound	53.784	1.000	53.784	.932	.354
Error(language*truth)	HR	Sphericity Assumed	300.561	12	25.047		
		Greenhouse-Geisser	300.561	12.000	25.047		
		Huynh-Feldt	300.561	12.000	25.047		
		Lower-bound	300.561	12.000	25.047		
	SkinC	Sphericity Assumed	692.869	12	57.739		
		Greenhouse-Geisser	692.869	12.000	57.739		
		Huynh-Feldt	692.869	12.000	57.739		
		Lower-bound	692.869	12.000	57.739		
language * phase	HR	Sphericity Assumed	.450	1	.450	.037	.851
		Greenhouse-Geisser	.450	1.000	.450	.037	.851
		Huynh-Feldt	.450	1.000	.450	.037	.851
		Lower-bound	.450	1.000	.450	.037	.851

	SkinC	Sphericity Assumed	59.147	1	59.147	1.032	.330
		Greenhouse-Geisser	59.147	1.000	59.147	1.032	.330
		Huynh-Feldt	59.147	1.000	59.147	1.032	.330
		Lower-bound	59.147	1.000	59.147	1.032	.330
Error(language*phase)	HR	Sphericity Assumed	147.274	12	12.273		
		Greenhouse-Geisser	147.274	12.000	12.273		
		Huynh-Feldt	147.274	12.000	12.273		
		Lower-bound	147.274	12.000	12.273		
	SkinC	Sphericity Assumed	687.440	12	57.287		
		Greenhouse-Geisser	687.440	12.000	57.287		
		Huynh-Feldt	687.440	12.000	57.287		
		Lower-bound	687.440	12.000	57.287		
truth * phase	HR	Sphericity Assumed	3.552	1	3.552	.265	.616
		Greenhouse-Geisser	3.552	1.000	3.552	.265	.616
		Huynh-Feldt	3.552	1.000	3.552	.265	.616
		Lower-bound	3.552	1.000	3.552	.265	.616
	SkinC	Sphericity Assumed	58.006	1	58.006	.997	.338
		Greenhouse-Geisser	58.006	1.000	58.006	.997	.338
		Huynh-Feldt	58.006	1.000	58.006	.997	.338
		Lower-bound	58.006	1.000	58.006	.997	.338
Error(truth*phase)	HR	Sphericity Assumed	160.949	12	13.412		
		Greenhouse-Geisser	160.949	12.000	13.412		
		Huynh-Feldt	160.949	12.000	13.412		
		Lower-bound	160.949	12.000	13.412		
	SkinC	Sphericity Assumed	698.141	12	58.178		
		Greenhouse-Geisser	698.141	12.000	58.178		
		Huynh-Feldt	698.141	12.000	58.178		
		Lower-bound	698.141	12.000	58.178		
language * truth * phase	HR	Sphericity Assumed	9.456	1	9.456	.908	.359
		Greenhouse-Geisser	9.456	1.000	9.456	.908	.359
		Huynh-Feldt	9.456	1.000	9.456	.908	.359
		Lower-bound	9.456	1.000	9.456	.908	.359
	SkinC	Sphericity Assumed	56.788	1	56.788	.986	.340
		Greenhouse-Geisser	56.788	1.000	56.788	.986	.340
		Huynh-Feldt	56.788	1.000	56.788	.986	.340
		Lower-bound	56.788	1.000	56.788	.986	.340
Error (language*truth*phase)	HR	Sphericity Assumed	124.961	12	10.413		
		Greenhouse-Geisser	124.961	12.000	10.413		
		Huynh-Feldt	124.961	12.000	10.413		
		Lower-bound	124.961	12.000	10.413		
	SkinC	Sphericity Assumed	691.221	12	57.602		
		Greenhouse-Geisser	691.221	12.000	57.602		
		Huynh-Feldt	691.221	12.000	57.602		
		Lower-bound	691.221	12.000	57.602		