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Does It Hurt? Depends on Who's Asking

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Abstract

The aim of this paper is to determine whether experimenter's professional status (Study 1) and familiarity (Study 2) affect participant's pain assessment, even when there are no other differences in the experimenter's characteristics. Both studies measured pain threshold and tolerance, and assessment of pain unpleasantness and intensity induced by thermal and electrical stimuli. In Study 1, experimenter introduced himself to participants as either a student (lower status) or an expert associate (higher status). ANOVA revealed significant and moderate to large effect of status only in thermal modality; as expected, participants tested by the higher status experimenter displayed higher thermal pain thresholds and tolerances. In Study 2, another experimenter conducted all the measurements; hers (higher) status was previously familiar to one group of students and disclosed to the other group just before the measurement. ANOVA revealed statistically significant and moderate effect of familiarity only in electrical modality; as expected, participants tested by the familiar higher status experimenter displayed higher electrical pain thresholds and tolerances. These results suggest that not only the professional status of a person measuring pain, but also individual's familiarity with it influences someone's pain assessment. With this in mind, researchers are encouraged to conduct studies that control for these factors and to include more information regarding experimenter's characteristics within their reports.

Keywords: experimenter's status, experimenter's familiarity, pain threshold, pain tolerance

Introduction

Suppose you felt a sharp, momentary pain, got scared and decided to go for a check-up in a local clinic. By the time you enter the examination room, your pain is long gone and you are trying to describe your symptoms to the clinic staff member who is gathering more detailed information about your condition. Would you say

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your pain assessment would be about the same, regardless who obtained ratings - a physician, his assistant or a nurse? Research on pain assessment in clinical settings would disagree and suggest that if you were admitted by a lower status clinic staff member, you would most likely provide not only higher pain ratings, but also less accurate ones (Williams, Park, Ambrose, & Clauw, 2007).

Pain experience is always subjective, shaped by the individual's characteristics and previous experience, which is why a person in pain should be best suited to provide an accurate pain assessment. However, if such assessment is virtually biased - depending also on the characteristics of a person gathering pain rating - both reliability and validity of pain measurement are threatened. To find out which characteristics of the personnel can interact with individual's pain assessment, researchers conducted a number of experimental studies and found that participants' pain reports are affected by conspicuous characteristics like experimenter's race (Weisse, Foster, & Fisher, 2005) and gender (Levine & De Simone, 1991). It should be noted, though, that the effect of the experimenter's gender on pain responsivity was not found in studies where experimenter's appearance was not purposely highlighted for gender cues (Feine, Bushnell, Miron, & Duncan, 1991; Otto & Dougher, 1985), hence some authors speculate that this effect is mediated by gender-role stereotypes (Wise, Price, Myers, Heft, & Robinson, 2002).

Now, race and gender are two characteristic that are represented by rather distinctive visible cues, and are in fact the first thing people take note of when establishing visual contact (Contreras, Banaji, & Mitchell, 2013); the question is whether pain assessment is affected only by those characteristics that include distinctive visible cues? To provide an answer, several researchers investigated the effect of the experimenter's status on participant's pain assessment. One's professional status is not something an individual can determine at first sight - he/she has to rely on various secondary cues (e.g. form of communication, clothing, behaviour in the presence of others, previous experience and other different-sources-presented information) in order to draw more or less accurate conclusions regarding someone's status. As pain research goes, this variety of status-related cues is both blessing and curse. On the one hand, it allows researchers to operationalize status in numerous ways and manipulate it in many different forms, which ultimately benefits ecologic validity. On the other hand, it tempts researchers to cumulate cues within single research, which ultimately complicates discernment regarding each cue's partial contribution in status-dependent pain assessment.

There is compelling evidence that people indicate higher pain threshold (Modić Stanke & Ivanec, 2016), higher pain tolerance (Kállai, Barke, & Voss, 2004) and rate pain as less unpleasant (Campbell, Holder, & France, 2006) when being tested by the higher status experimenter. These results are mainly interpreted in the context of socially-desirable behaviour. Namely, when tested by the higher status experimenter, participants perceive the study as more relevant and modify their pain behaviour accordingly. It is noteworthy that researchers eliminated the idea that individuals tailor their pain behaviour deliberately; however, the question why they behave differently in the presence of different-status experimenters - remains unanswered. Some authors suggest that experimenters with higher authority elicit greater physiological arousal, which ultimately leads to reduced pain sensitivity (Campbell et al., 2006); so far, there is no conclusive evidence for this mediator effect.

Although all above-mentioned studies provide evidence in favour of the status-driven bias in pain assessment, certain design-related issues hinder clarity of conclusions regarding the effect of status on pain measurement. The first issue has to do with the characteristics of individuals used as different-status experimenters in each study. They were above all different individuals who, apart from status, also differed in personality, communication style and physical appearance (e.g. age, height, attractiveness) thus, it remains unclear if obtained effects are result of status per se or some other experimenter-related characteristic. The second issue has to do with different strategies previous studies used in order to present and highlight information regarding experimenter's status. Some authors decided to use unfamiliar experimenters, introducing participants with their status at the beginning of measurement and boosting that information with several cues during measurement (Campbell et al., 2006; Kállai et al., 2004). Other authors decided to use experimenters with whom participants were already familiar with (the sophomore student and the professor) therefore avoiding the need to give any formal information regarding status (Modić Stanke & Ivanec, 2016). Although both strategies include legit manipulation of the experimenter's status, the meaning of status in case of familiar and unfamiliar experimenters is notably different. Since the effect size in the latter study was substantial, one cannot help wondering about the extent to which the familiarity of experimenter additionally contributed to status-based bias effect.

The aim of the present work was to provide an answer to the above-mentioned questions. For this purpose, we conducted two separate studies; each followed the ethical principles for conducting research with human participants and was approved by the local Ethical Committee.

Study 1

First, we aimed to determine whether mere information about professional status affects participant's pain assessment even when no other differences in the experimenter's characteristics exist. Thus, in Study 1, only one experimenter conducted measurements with all participants, introducing himself to half of the participants as an expert associate (higher status) and to the other half as a psychology student (lower status). The experimenter's task was to induce pain using thermal and electrical stimuli and to measure participant's pain thresholds and tolerance along with the assessment of pain unpleasantness and pain intensity. We expected that participants tested by the higher status experimenter would display higher pain thresholds and tolerances, and express lower pain unpleasantness ratings.

Additionally, in concordance with gender roles, we expected men to have higher pain thresholds and tolerances, and to assess pain as less unpleasant.

Methods

A number of studies suggested that men and women differ in pain responsivity but also indicated that these differences vary across pain modalities (Riley, Robinson, Wise, Myers, & Fillingim, 1998). Moreover, previous research demonstrated interaction between participant's gender and characteristics of the experimenter (Aslaksen, Myrbakk, Høifødt, & Flaten, 2007; Gijsbers & Nicholson, 2005). Hence, we decided to include both gender participants in the study and to use two notably different pain modalities - thermal and electrical. A single male status experimenter conducted the study, but he introduced himself either as a student (lower status) or as a psychologist (higher status). The study design is illustrated in Figure 1.

		EXPERIMENTER	
		lower professional status	higher professional status
PARTICIPANT	female	*n* = 12	*n* = 12
	male	*n* = 13	*n* = 12

Figure 1. Design with the two factors: Participant gender and experimenter professional status. All participants in all four conditions were tested by the same male experimenter.

Participants

Fifty-two non-psychology students (26 females) between 18 and 28 years old voluntarily signed up to participate in the study. Female participants were on average 21.23 years old (SD = 2.49) and male participants were on average 21.31 years old (SD = 2.40). The participants had no prior experience with any kind of pain research and none of them had met the experimenter before the measurement. They were recruited using several different methods - via Facebook, paper-ads and verbal transfer. One male individual decided to exercise his right to withdraw from the measurement so the final number of males whose results were analyzed in the study is n = 25. Subsequently, participants filled in the health-questionnaire designed as a screening tool to identify and exclude individuals that had a medical history of serious illness or injuries; two female individuals were excluded due to self-reported illness (monoparesis and depression) so the final number of females whose results were analyzed in the study is n = 24. Each participant received a symbolic reward (research participation credits that students are required to obtain before graduation) for the participation in the study.

The experimenter was a 26-year-old male that introduced himself to participants either a) as a psychology student (lower professional status) that is conducting research within his graduate thesis or b) as a psychologist (higher professional status) hired as an associate researcher in the present study. The experimenter clothing (casual vs. business casual) and form of address (informal vs. formal) additionally differentiated two different-status situations.

Measures and Apparatus

Two different methods were applied to induce pain in two modalities - thermal and electrical. Thermal stimuli were induced by the hot air flow at the 1.5 cm^2 area in the middle of the left palm. The device was placed at the distance of 12 cm from the participant's hand and it was set to constantly produce uniform heat stimuli. The temperature of the hot air at the source was 55 degrees Celsius and the one adjacent to the palm was about 10 degrees lower. Although pain was induced by continuous same-temperature thermal stimuli, participants perceived different pain experience during measurement (ranging from sensing warmth to impossible-to-endure pain) due to temporal summation of noxious stimuli. Pain responsivity measures included the duration (in seconds) from the point heat stimulation started till the moment a) participant declared stimulation just become painful (pain threshold) and b) participant declared he/she could not tolerate the pain further on (pain tolerance). Right after the ending of heat stimulation, participants assessed both general thermal pain unpleasantness and highest thermal pain intensity on the scale from 0 (*lowest unpleasantness*/*intensity*) to 30 (*highest unpleasantness*/*intensity*).

Electrical stimuli were induced on the index finger and ring finger of the right hand using the DS5 isolated bipolar stimulator (Digimeter Ltd, United Kingdom) that allows computer control of stimulus amplitude and timing parameters. The computer program was designed to allow a stimulation range from 0 to 255 units (equal to the maximum constant current output of 10 mA). Sequenced stimuli were generated several seconds apart, each 5 units (about 0.20 mA) surpassing previous one. Pain responsivity measures included the amount of constant current output related to a) the lowest electrical stimuli participant declared to perceive as painful (pain threshold) and b) the highest electrical stimuli participant declared he/she could tolerate (pain tolerance). Immediately after the completion of electrical stimulation, participants assessed both general electrical pain unpleasantness and highest electrical pain intensity on the scale from 0 (*lowest unpleasantness*/*intensity*) to 30 (*highest unpleasantness*/*intensity*).

In accordance with previous research (Campbell et al., 2006; Kállai et al., 2004), each participant rated experimenter's characteristic on a 7-point scale. Rated characteristics included authority, expertise, organization, experience, confidence, amiability and responsibility in order to test if they would be attributed differently to the same experimenter merely due to the information regarding his professional status.

Procedure

All measurements were conducted individually in the period of winter/spring 2015. Each measurement took place in the radio-frequency anechoic chamber and the duration was approximately half an hour per participant. Throughout entire measurement, experimenter communicated with the participants, both face-to-face (before, between and after painful stimulation) and through the communication device (during painful stimulation).

Following experimenter's introduction, participants read the research outline and signed an informed consent form. After that, they entered the chamber and set in front of the table surrounded by the apparatus. Experimenter informed participants that thermal stimuli would be induced before electrical ones and asked them to warm up their hands in order to equalize hand temperature prior to measurement. Concurrently, participants provided information regarding their health status; if participants noted to have a medical history of serious illness or injuries they would be asked to withdraw from the measurement. Next, experimenter placed and immobilized participants' left hand in the fixated splint and informed participants that their task was to initiate thermal stimulation, verbally report about their pain development (worm - hot - stings - first sensations of pain (i.e. pain threshold) - nondurable pain) and finally terminate thermal stimulation (i.e. pain tolerance). After he prepared participants for measurement, experimenter exited the chamber, leaving participants alone. Further participant-experimenter communication during measurement went through the two-way communication device. Thermal stimulation was limited to two minutes due to ethical principles. Participants were not previously informed about this time limit. When thermal stimulation was over, the experimenter entered the chamber and asked the participants to rate the thermal pain unpleasantness and the thermal pain intensity.

After a short recess, experimenter informed participants that they were about to face electrical stimulation. Prior to placing the electrodes, experimenter treated each finger with alcohol in order to diminish individual differences in skin resistance. Then the experimenter informed participants that electrical stimuli would be induced sequentially, each slightly greater in magnitude than the previous one. He pointed out that participants' task was to rate each stimulus on the scale from 0 (*no pain*) to 10 (*nondurable pain*) and that the object of measurement was the amount of electrical current of the first increscent stimulus participant would rate other than 0 (*pain thresholds*) and the final increscent stimulus, the one participant would rate as 10 (*pain tolerance*). After preparing participants for the measurement, the experimenter exited the chamber, leaving participants alone. Shortly afterwards, the experimenter started with the procedure. Using a communication device, experimenter notified participants of each increasing stimulus by saying "attention" just before inducing them. Stimulus sequence started with the lowest amount of current (0.20 mA) and was followed by successive increscent stimulus in intervals 0.20 mA until the moment participant rated the pain as nondurable. When the electrical stimulation ended, the experimenter entered the chamber and asked the participants to rate electrical pain unpleasantness and electrical pain intensity. Posterior to measurement, participants were asked to rate several issues regarding the study, experimenters characteristics being one of them. In order to enhance honesty and the sense of anonymity, each participant provided ratings privately and personally placed his/her ratings into the ballot box.

Statistical Analysis

Pain responsivity measures in both modalities included pain threshold and tolerance along with the assessment of pain unpleasantness and intensity. Preliminary analysis revealed that most pain-responsivity measures met assumptions for parametric testing; data for two measures (thermal pain threshold and tolerance) that initially did not meet these assumptions were log-transformed in order to normalize the distribution and stabilize the variance. Separate two-way analysis of variances (ANOVA's) were calculated for each dependent variable in each modality [i.e. 2 x 2 ANOVA's with status (high vs. low) and gender (male vs. female) as between-subject factors were calculated]. Effect sizes were calculated as partial eta squared and interpreted using Cohen's (1988) guidelines.

Results and Discussion

The results are reported in concordance with the procedure - the first section is devoted to the analysis of pain responsivity in the thermal stimuli setting, followed by the section devoted to the same analysis in the electrical stimuli setting. Due to the size of the table, descriptive statistics regarding all pain responsivity measures for both types of stimuli is shown in Appendix A. Standard level of significance (.05) was used; only results that are statistically significant or close to significance were reported with exact *p* values, non-significant results (p >.10) were not reported. Participant's ratings of the experimenter's characteristics are reported in the final section.

Pain Responsivity

Thermal Stimulation

As hypothesized, when tested by the higher status experimenter participants took longer to indicate that noxious stimuli just become painful, F (1, 45) = 9.75, p =.003, η_p^2 = 0.18, and it is noteworthy to indicate that this status effect was proven to be large. Also in accordance with the hypothesis, participants took longer to indicate that noxious stimuli become nondurable, F (1, 45) = 4.12, p = .048, η_p^2 = 0.08, and the size of this effect was found to be moderate. Conversely, experimenter's status did not affect the assessment of thermal pain unpleasantness and general assessment of intensity. Even though data trends suggest that man might have a higher thermal pain threshold than women, this difference failed to reach significance (F (1, 45) = 3.30, p = .076). However, gender differences in thermal pain tolerance were found to be significant, thus we can rightfully say that men endured thermal pain longer than women, F (1, 45) = 4.23, p = .045, $\eta_p^2 = 0.09$. Men and women both rated thermal pain unpleasantness as moderate (M = 16.63, SD = 4.92) and intensity as large (M = 24.55, SD = 3.29), however, no gender differences were found regarding this assessment. Also, no gender × status interaction effect was found for either of four pain responsivity measures.

Electrical Stimulation

Contrary to our expectations, participants tested by the higher status experimenter displayed no differences in any of the four pain responsivity measures with regards to participants tested by the lower status experimenter. Furthermore, no gender differences in any of four electrical pain responsivity measures were found; though it seemed that men had tendency to tolerate greater amperage of electrical noxious stimuli, this difference failed to reach significance (F (1, 45) = 3.43, p = .071). Finally, no gender × status interaction effect was found for none of the four electrical pain responsivity measures.

Experimenter's Characteristics

All measured experimenter's characteristics (authority, expertise, organization, experience, confidence, amiability and responsibility) participants rated as above average, but those ratings did not differ regarding experimenter's professional status. These findings state that obtained status-based bias in pain responsivity is not due to experimenter's (un)conscious behaviour during measurement, but solely due to the mere information regarding the professional status of the person conducting the measurement.

Study 2

The present study was conducted to determine whether familiarity of experimenter additionally emphasizes his/her professional status and to explore the extent to which this plays a role in participant's pain assessment, even when there are no other differences in the experimenter's characteristics. Therefore, in study 2 only one higher status experimenter tested two groups of participants - one that was previously familiar with her higher status and the other that became aware of it just before the measurement. Consistent with the study 1, the experimenter's task was to induce pain using thermal and electrical stimuli and to measure participant's pain thresholds and tolerance along with the assessment of pain unpleasantness and intensity. We expected that participants would display higher pain thresholds and tolerances and lower pain unpleasantness ratings when tested by the familiar higher status experimenter. Additionally, in concordance with gender roles, we expected men to have higher pain threshold and tolerance, and to assess pain as less unpleasantness.

Methods

Consistent with the reasons listed in Study 1, we decided to include both gender participants in the study. In Study 2, a single 34-year-old female experimenter conducted the measurement. The experimenter was an assistant professor at the Department of Psychology and all participants were acquainted with her higher status prior to the measurement. However, only half of them were familiar with this information for a certain amount of time, whilst the rest of them learned that information not long before the measurement. Experimenter's dress code and form of address were the same for all participants. The study design is illustrated in Figure 2.

		HIGHER STATUS EXPERIMENTER	
		previously familiar	previously unfamiliar
PARTICIPANT	female	*n* = 20	*n* = 20
	male	*n* = 15	*n* = 16

Figure 2. Design with the two factors: Participant gender and familiarity of experimenter higher professional status. All participants in all four conditions were tested by the same female higher status experimenter.

Participants

Fresh sample with a total number of seventy-one individuals (40 females) between 18 and 26 years of age participated in the study. Thirty-five of them were first-year psychology students (20 females) previously familiar with the experimenter's higher status because she was teaching a course they all started attending several weeks prior to measurement. They were recruited during course practicum and had no prior experience with this kind of pain research. Remaining 36 participants were non-psychology students that had no previous experience with any kind of pain research; the third-year psychology students, adequately rewarded for their engagement, recruited them. Non-psychology students were also previously informed about the higher status of the experimenter, but had no personal contact with her before the measurement. All participants read the research outline and signed an informed consent form. The answers they provided in health-questionnaires indicated there were no medical obstacles for their participation in the study. Each participant was rewarded for participation in the study. This research followed the ethical principles for conducting research with human participants and was approved by the local Ethical Committee.

Apparatus, Measures, and Procedure

Apparatus for pain inducement, four pain measures in each of two modalities and the procedure were identical to those in Study 1. With regards to the characteristics of the experimenter participants rated on a 7-point scale in Study 1, some minor changes were made. Engagement of uniform higher status experimenter eliminated the need for the assessment of experience and confidence. Perceived characteristics of the experimenter that were additionally tested included leisureliness, friendliness, seriousness, kindness and availability.

Statistical Analysis

Preliminary analysis revealed that most pain-responsivity measures initially met assumptions for parametric testing with the exception of thermal pain threshold and tolerance, and electrical pain threshold - which were consequently log-transformed in order for the data to fit the assumptions better. Separate factorial ANOVA's were calculated for each variable in each modality (i.e. 2 x 2 ANOVA's with status (familiar vs. unfamiliar) and gender (male vs. female) as between-subject factors were calculated). Effect sizes were calculated as partial eta squared and interpreted using Cohen's (1988) guidelines.

Results and Discussion

The results are reported in three sections - first two devoted to the analysis of pain responsivity in thermal and electrical settings and final devoted to links between participants' pain responsivity and perceived experimenter's characteristics. Due to the size of the table, descriptive statistics regarding all pain responsivity measures for both types of stimuli is shown in Appendix B. Standard level of significance (.05) was used; only results that are statistically significant or close to significance were reported with exact *p* values, non-significant results ($p > .10$) were not reported.

Pain Responsivity

Thermal Stimulation

Contrary to our expectations, participants tested by the familiar higher status experimenter displayed no differences in any of four pain responsivity measures with regards to participants tested by the unfamiliar higher status experimenter. Additionally, in accordance with the assumptions regarding gender roles, men took longer to indicate that thermal noxious stimuli just become painful, F (1, 67) = 3.87, $p = .053$, $\eta_p^2 = 0.06$, and to terminate noxious stimuli when they become nondurable, *F* (1, 67) = 6.63, *p* = .012, η_p^2 = 0.09. Men and women both rated thermal pain unpleasantness as moderate (*M* = 18.14, *SD* = 4.52) and intensity as large (*M* = 23.86, *SD* = 3.20), however, no gender differences were found regarding this assessment. Finally, no gender × familiarity interaction effect was found in either of four pain responsivity measures.

Electrical Stimulation

As hypothesized, participants tested by the familiar higher status experimenter took a greater amount of electrical stimuli to note minimally painful sensation, *F* (1, 67) = 4.10, *p* = .047, η_p^2 = 0.06, and to indicate pain as nondurable, *F* (1, 67) = 5.42, *p* = .023, η_p^2 = 0.08. One should note that the effect sizes regarding both pain threshold and tolerance were proven to be moderate.

Conversely, experimenter's familiarity did not affect the assessment of thermal pain unpleasantness and intensity. Additionally, on a descriptive level, the men seemed to indicate both pain threshold and tolerance at a greater amount of electrical stimuli, however, this gender difference failed to reach significance regarding electrical pain threshold, *F* (1, 67) = 2.85, *p* = .096, proving this statement to be accurate only with regards to electrical pain tolerance *F* (1, 67) = 7.93, *p* = .006, η_p^2 = 0.11. Men and women both rated electrical pain unpleasantness as moderate (*M* = 16.89, *SD* = 6.76) and intensity as large (*M* = 20.95, *SD* = 5.50), however, no gender differences were found regarding this assessment. Also, no gender × familiarity interaction effect was found for either of four pain responsivity measures.

Experimenter's Characteristics

The level of the experimenter's familiarity did not affect the participant's perception of the experimenter's characteristics; participants rated experimenter's authority, expertise, organization, amiability, responsibility, leisureliness, friendliness, seriousness, kindness and availability about the same - regardless if they knew her previously or they have just met. These results imply that the experimenter acted the same way in the presence of each group of participants, anchoring conclusion that familiarity with an experimenter of a certain status can amplify status-based bias in pain assessment.

General Discussion

Both studies reported here demonstrate that professional status, beyond other characteristics of the person conducting pain measurement, affects pain responsivity of the individual experiencing pain. This was the case in Study 1 where participants tested by the higher status experimenter indicated thermal pain later and endure it longer and in Study 2 where participants tested by the familiar higher status experimenter experienced higher levels of current amperage when noted to feel pain and when ended the noxious stimuli. Throughout the rest of this section, we discuss some limitations of the current work, comment our findings with regard to prior studies of status-based bias in pain assessment and annotate the practical contribution of the present work in the broader context.

Limiting Conditions

Several features of the present work limit the conclusions we can draw regarding the effect of the professional status on pain assessment. First, the design of both studies disregarded the possible effect of the experimenter's gender, thus we can only speculate whether participants would behave in the same manner when tested by the opposite gender experimenter. Additionally, results regarding the effect of status and familiarity would be even more convincing if the same person conducted measurements in both studies. Next, we used pain measures that allowed us to detect possible differences in pain behaviour, but no additional measures (e.g. arousal, state anxiety or level of trust elicited by the experimenter) that might indicate why participants behaved differently in different status-related conditions. Finally, although we elicited pain in two notably different modalities in order to allow greater generalizability, one should note that experimentally induced pain experience qualitatively differs from the natural pain experience in clinical settings providing present research with only limited ecological validity.

The sample size in both studies is rather small, which a priori limits statistical power. However, we consulted the data from several studies that investigated the relationship between experimenter status and different aspects of pain (Campbell et al., 2006; Kállai et al., 2004; Modić Stanke & Ivanec, 2016) and noted that effect sizes (indicated as Cohen *d* and partial eta squared) were ranging from small to large (0.26 - 0.62, η_p^2 = 0.20 - 0.59). Therefore, while planning the study design, we used G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007) to calculate the sample size for the desired power (0.80) and expected moderate effect size (η_p^2 = 0.15) in mixed research design. The recommended sample size was N = 40. In our opinion, the samples sizes in this research were not the primary reason for some of the statistically non-significant effects.

In both studies, the order of stimulation was the same for all the participants: first thermal and then electrical, i.e. there was no rotation between thermal and electrical stimulation across participants. In repeated measures design, carry-over effects are always present and researchers usually try to avoid it by using rotation designs. However, we decided not to rotate stimulation situations because of the findings (Ivanec, Pavin, & Kotzmuth, 2006) suggesting a possibility of the interaction between the measurement-order and the experimental situation, we believed that the same stimulation-order that might produce a certain effect of habituation would be potentially less damaging than rotation that might produce more complex interactions.

Sensory Component of Pain

Mere Status Effect

Results regarding thermal pain threshold and tolerance in Study 1 are consistent with previous findings (Kallai et al., 2004; Modić Stanke & Ivanec, 2016) and suggest that mere information about the professional status of the person conducting measurement effects not only an individual's willingness to endure noxious stimuli but also his/her pain perception. Both men and women tested by the higher status experimenter indicated to perceive thermal stimuli as painful seconds later than their mates in the lower-status situation, and this status-driven effect was proven to be large. Although this indicates that people actually perceive noxious stimuli differently in the presence of the different status experimenter, an alternative explanation is also possible. Given the fact that during pain threshold measurement, we rely solely on participant's verbalization, it is also possible that experimenter's status does not affect pain perception per se, but only participant's readiness to verbalize it.

Contrary to findings regarding thermal modality, both male and female participants displayed no expected status-driven differences regarding electrical pain threshold and tolerance in Study 1. Although not expected, such non-congruence between modalities is not surprising; studies that compared different aspects of pain depending on the way pain was induced report ambiguous results. Specifically, some studies obtained significant positive correlations between pain modalities (Bhalang, Sigurdsson, Slade, & Maixner, 2005; Neddermeyer, Flühr &, Lötsch, 2008), while others found no correlations between responses to different noxious stimuli (Janal, Glusman, Kuhl, & Clark, 1994; Neziri et al., 2011). One plausible explanation for these inconsistent findings can be found within the qualitative difference in pain sensations induced by the different types of stimuli.

In the present work difference between modalities was substantial, including general differences between thermal and electrical stimuli (electrical stimulation feels less natural, individuals are relatively inexperienced with it, they tend to be anxious around it and incline to avoid it), and some study-specific ones (continuous uniform thermal stimuli vs. successive increasing electrical stimuli administration; different perception of control). It is possible that participants tested by the unfamiliar experimenter - regardless his status - were just too anxious to trust him with "frightful" electrical stimulation and that their wariness regarding electrical stimuli simply prevailed any possible existing status effects. Results of Study 2 support this statement; participants displayed higher pain threshold and tolerance in the presence of familiar higher status experimenter suggesting they were comfortable enough with the situation to provide evidence for the existing familiarity effect. This explanation, however, remains purely speculative because state anxiety, arousal and level of trust were not measured in this study.

Mere Familiarity Effect

Results regarding electrical pain threshold and tolerance in Study 2 suggest the possibility that - at least concerning this modality - familiarity with the person conducting measurement might amplify the effect of the higher status experimenter on pain responsivity; however, it should be noted that following studies (including low-status familiar and unfamiliar experimenter) are needed to further investigate this possibility. Both men and women tested by the familiar higher status experimenter indicated a greater amount of electrical current as being "just painful" (pain threshold) and "nondurable" (pain tolerance), and this familiarity-driven effect was proven to be moderate. Similar to findings in Study 1, non-congruence between modalities also occurred in Study 2; male and female participants displayed expected familiarity-driven differences in pain threshold and tolerance while experiencing electrical, but not thermal stimuli.

Again, these results can be explained considering different quality of each pain modality. It is possible that participants during more natural, controllable and less threatening thermal stimulation reached their "plateau" regarding threshold and tolerance when being tested by the higher status experimenter so familiarity did not additionally contribute to this effect. Although results regarding unfamiliar higher status experimenter in both studies are not directly comparable due to different characteristics of the experimenters, almost identical average time-period regarding pain threshold and tolerance support this assumption. Conversely, higher status per se was not enough to reduce anxiety or ease the "frightful" situation during electrical stimulation, but when this higher status was combined with the familiarity of the person conducting the measurement, participants displayed higher pain threshold and tolerance. These assumptions, however, are yet to be tested.

Affective Component of Pain

Assessment of pain unpleasantness and pain intensity within a single pain modality remained stable across all situations - regardless of participant's gender, experimenter's status and experimenter's familiarity. Although we did not expect participants to differ in their assessment of pain intensity, we expected them to assess lower pain unpleasantness when tested by the higher status experimenter, and when tested by the familiar status experimenter. There are two possible explanations for these unexpected findings. First explanation refers to the fact that pain is a multidimensional experience and includes several components. It is, therefore, possible that status and familiarity affect sensory component of pain (thresholds and tolerance) but not affective component of pain (unpleasantness). Second explanation refers to methodological features of pain unpleasantness assessment. It is possible that participants, when assessing pain unpleasantness, took into account the entire range of stimuli between "just painful" and "nondurable", inevitably indicating average ratings in each situation.

Additionally, when considered combined with results of status effect in thermal modality in Study 1 and results of familiarity effect in electrical modality in Study 2, these findings also suggest that, if the measurement was conducted differently, the effect of status and familiarity on pain unpleasantness ratings might be detected. Namely, if the study design enabled participants to experience and assess each stimulus per se, they would likely provide lower ratings for the same thermal stimuli in the presence of the higher status experimenter in Study 1 and the same electrical stimuli in the presence of the familiar status experimenter in Study 2.

General Implications

Present findings contribute to both pain research and treatment. From a researcher's point of view, information that pain assessment depends on the status and familiarity of a person conducting measurement signifies that he/she would consider these factors when conducting future measurement and clearly state information regarding status and familiarity when reporting results of the study. From a clinician's point of view, this information is vital when assessing treatment effectiveness and signifies that he/she should equalize pain measurement conditions before and after pain treatment in order to avoid interference of the status or familiarity of a person measuring pain. In other words, people who treat pain should take characteristics of clinic staff members into account when drawing conclusions about a patient's condition or deciding on the adequate treatment; different pain ratings in two measurement points do not necessarily imply that patient's pain has changed - obtained difference might also be due to the difference in personnel in charge with the pain measurement.

Thus, what stands out in the present work is that not only the professional status of a person measuring pain, but also an individual's familiarity with it affects one's pain assessment; and the findings lead to some practical advice: when in pain, go see a doctor you already know - he'll treat the symptoms as well as the next one but at least the procedure will not hurt as much.

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Boli li? Ovisi o tome tko pita

Sažetak

Cilj je ovoga rada bio utvrditi utječu li profesionalni status (prvo istraživanje) i poznatost (drugo istraživanje) eksperimentatora na procjenu boli sudionika, čak i kada nema drugih razlika u karakteristikama eksperimentatora. U oba su istraživanja mjereni prag i tolerancija boli te procjene neugode i intenziteta boli izazvane toplinskim i električnim podražajima. U prvom se istraživanju eksperimentator predstavio sudionicima kao student (niži status) ili kao stručni suradnik (viši status). ANOVA je pokazala značajan i umjeren do velik učinak statusa eksperimentatora samo u termalnom modalitetu; sudionici su čije je mjerenje provodio eksperimentator višeg statusa, u skladu s očekivanjima, pokazivali viši prag i toleranciju boli na toplinske podražaje. U drugom je istraživanju sva mjerenja provela eksperimentatorica čiji je (viši) status jednoj grupi studenata bio otprije poznat, dok je drugoj grupi bio otkriven neposredno prije mjerenja. ANOVA je pokazala statistički značajan i umjeren učinak poznatosti samo u električnom modalitetu; sudionici čije je mjerenje provodila prethodno poznata eksperimentatorica višeg statusa pokazivali su viši prag i toleranciju boli na električne podražaje, što je bilo očekivano. Ovi rezultati sugeriraju da na procjenu boli pojedinaca ne utječe samo profesionalni status osobe koja mjeri bol već i njihova prethodna upoznatost s njime. Imajući to na umu, istraživače se potiče da prilikom budućih istraživanja kontroliraju ove čimbenike te da u radove uključe detaljnije informacije o karakteristikama eksperimentatora.

Ključne riječi: status eksperimentatora, poznatost eksperimentatora, prag boli, tolerancija boli

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Appendix A

Table 1.

Descriptive Statistics of Results Obtained in Study 1, Associated with the Four Pain Responsivity Measures in the Four Experimental Groups (Participant Gender × Experimenter Status) Depending on the Type of Painful Stimuli

			lower status experimenter ("student")			higher status experimenter ("psychologist")		
stimuli	measure	participant	*n*	*M*	*SD*	*n*	*M*	*SD*
thermal	pain thresholds	male	13	20.08	4.39	12	28.08	10.92
		female	12	17.00	6.00	12	23.83	9.96
	pain tolerance	male	13	29.31	9.41	12	45.83	36.32
		female	12	24.5	16.84	12	29.58	12.00
	pain unpleasantness	male	13	17.54	3.80	12	15.92	4.32
		female	12	16.33	5.79	12	16.67	6.02
	pain intensity	male	13	24.38	2.14	12	23.33	4.79
		female	12	24.83	2.33	12	25.67	3.26
electrical	pain thresholds	male	13	0.60	0.23	12	0.65	0.45
		female	12	0.67	0.44	12	0.51	0.13
	pain tolerance	male	13	4.78	2.03	12	4.80	1.55
		female	12	4.04	1.49	12	3.84	1.25
	pain unpleasantness	male	13	13.54	5.27	12	17.75	6.94
		female	12	14.08	4.36	12	12.50	4.21
	pain intensity	male	13	22.00	4.47	12	21.75	4.45
		female	12	22.75	5.17	12	21.92	5.37

Appendix B

Table 2.

Descriptive Statistics of Results Obtained in Study 2, Associated with the Four Pain Responsivity Measures in the Four Experimental Groups (Participant Gender × Experimenter Familiarity) Depending on the Type of Painful Stimuli

			"unfamiliar" higher status experimenter			"familiar" higher status experimenter		
stimuli	measure	participant	*n*	*M*	*SD*	*n*	*M*	*SD*
thermal	pain thresholds	male	16	29.56	14.26	15	21.40	9.37
		female	20	20.70	9.25	20	19.75	5.89
	pain tolerance	male	16	41.94	26.40	15	48.47	39.57
		female	20	31.10	21.29	20	26.55	10.00
	pain unpleasantness	male	16	17.38	4.30	15	17.27	4.25
		female	20	18.00	5.95	20	19.55	2.93
	pain intensity	male	16	23.84	3.48	15	22.47	3.34
		female	20	24.02	3.52	20	24.75	2.29
electrical	pain thresholds	male	16	0.59	0.16	15	0.95	0.94
		female	20	0.49	0.20	20	0.71	0.54
	pain tolerance	male	16	3.74	1.93	15	5.66	2.68
		female	20	3.26	1.83	20	3.51	1.33
	pain unpleasantness	male	16	14.09	6.99	15	18.70	4.80
		female	20	18.15	7.72	20	16.50	6.52
	pain intensity	male	16	19.75	5.15	15	23.33	3.66
		female	20	20.43	6.48	20	20.65	5.71