Nonverbal Communication and Expectation Generation

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Preface

The project comes at the end of the bachelor's course in psychology at NTNU, Trondheim. Initially going into the project with little knowledge, the course has been a valuable learning experience. Supervisor Hojjat Daniali and assistant Stephanie Anne Paoli has provided help and education well throughout the course. With help during the course, including weekly meetings and ongoing evaluations, the thesis has been completed. I would like to thank fellow students, Daniali and Paoli for the help as well as any outsiders answering to surveys to enable the execution of this thesis.

Abstract

Nonverbal behavior (NB) is a part of the psychosocial context in which patient-provider relationships happen. Previous study has proven its ability to manipulate treatment outcomes. As part of a bigger project that studies NBs effect on treatment outcome related to heat-pain, this thesis primary aim is to investigate if the NBs used is reliable and valid. Through 21 videos of three actresses channeling specific NBs masquerading as a health professional, patients are introduced to a heat-pain relieving cream called *Embla*. The thesis secondary aim investigates how the sex of the patient and provider affects treatment outcome. As the design is of a limited scope, no research taken from this study is generalizable.

Communication between humans consists of both verbal and nonverbal behavior. Although in today's age we can express our thoughts verbally it has not always been so. Before humans developed complex verbal communication, our nonverbal behaviors (NBs) were even more important than they are today. This does not mean the content of what was communicated were necessarily lacking as humans are remarkably good at expressing thoughts and feelings through NBs (Ambady & Weisbuch, 2010, p 465). It is impossible to not communicate nonverbally when meeting physically and so it is exceptionally important to understand it`s effect, especially in relation to provider-patient relationships (Blanch-Hartigan et al, 2018, p. 2209).

Existing research have found how men and women express themselves differently when it comes to NBs. Women have been found to smile and gaze more than men, while also having more facial expressiveness (Ambady & Weisbuch, 2010, p. 474-475). Moreover, it has also been found that supportive nonverbal behavior can decrease experienced pain in patients when presented by an actor-physician. The study by Ruben, Blanch-Hartigan and Hall hypothesize that interacting with a physician displaying NBs such as leaning forward and using a warm tone of voice would decrease objective and subjective pain experience in a patient. In this study the NB is presented as singular variable, supportive NB, and as such is basing itself on macro-level NBs (Mollie A. Ruben et al., 2017, p. 970). Another article conceptualizing rapport also uses macro-level NBs, describing three components relating to the notion: attentiveness, positivity, and coordination. Rapport, strongly relating to patient-provider relationships, would not be induced if not reciprocated in nonverbal cues (Tickle-Degnen & Rosenthal, 1990, p. 288). They weigh attentiveness and positivity in early interactions, which is most in tune with this thesis. Project supervisor Hojjat Daniali has also contributed research to the topic together with Magnus Arve Flaten. In relation to this thesis secondary aim, they mention how characteristics such as sex can contribute to the report of pain, stating: ".. the stereotypical male gender role is characteristically stoic and tries to impress women by their capability to tolerate pain, whereas the female role displays higher sensitivity to pain to induce protective behaviors in men" (2019, p. 2).

The bigger, ongoing project this thesis is based on differs from most existing research by the scale of focus. Recent research in this field focus on macro-level NBs, which is the overall effect of nonverbal communication. Micro-level NBs, which is the specific NBs researched in

isolation, is the focus of the mother project. Specifically positive facial expressions (PFE), positive tone of voice (PTV), positive body movements (PBM) and neutral NB`s (NeB) is channeled to see how it changes pain perceived in a patient when a videotaped female experimenter introduces a heat pain-relieving cream. This is done through videoclips where three actresses play the role of provider, and the cream is placebo. The mother project's main goal is to research if the NBs can produce positive expectations and reduced pain.

We often hear about the lack of men in fields of health and social services and especially psychology (anonymous, 2021) as well as stigma surrounding the mental health of men (Chatmon, 2020, p. 1-2). This may reflect the need of male therapists and psychologists, both as a benefit in specific situations and in terms of societal change. As psychology stereotypically is associated to feminine traits it may be hard for some to against the grain. One may think about differences in what men and women need from their provider relationships and further how the sexes may reap benefits from having their provider be of the same sex. If and how men and women perceive NBs should be investigated to produce a more tailored patient-provider experience. In doing so, practices such as therapy can hopefully achieve higher efficiency.

The primary aim is to test the reliability and validity of the NBs presented in the mother project. This is done to find whether the specific NB`s can be helpful and legitimately used in research, and further hopefully improve the patient experience. As the mother project wishes to find how NBs influence perceived pain it is essential that the measures are in tow with what the study is trying to find. For the secondary aim, which researches how men and women respond differently to NBs, the students will collect data themselves and analyze it within the framework of their goal. To reiterate, the dependent variables are nonverbal behavior and time, and the independent variable is sex.

As the bachelor thesis consists of two aims, each subsection of the method section will also include two parts. First of which focus on the reliability and validity of nonverbal behavior in patient-provider relationships while the second focuses on difference in perception of experienced pain level between sexes before and after watching the recorded videos of one actor which channel the four different NBs mentioned earlier.

Methods

Actors

For the videoclips three actors have been used and will be referred to as actor 1, 2 and 3. The actors are all female, Norwegian, Caucasian and in the age-range of 25-30. They received training from the writers of the mother project, where they were instructed to express one of four NB`s in isolation. For example, when they shot the video for PFE they were instructed to channel positive emotion through their face while keep other NB`s as neutral as possible.

Videos

There are 22 different videos used in the mother project. Actors 1 and 2 were included in seven videos while actor 3 were included in 8. The seven video categories for all actors were as follows: calibration, introduction, pretest, NeB, PBM, PFE and PTV. Actor 3 had warm and friendly NBs as a category in addition to the seven. In the videos of calibration, introduction and pretest the NBs were not expressed in isolation.

Coding study

Coders and training

The coders include 15 students currently studying a bachelor's degree in Psychology at Norwegian University of Science and Technology (NTNU), Trondheim. 11 students are female (min_{age}=21 years, max_{age}=25 years, range=4 years, M_{age}=23 years, standard deviation (SD)=1.23 years) and 4 students are male (min_{age}=22 years, max_{age}=25 years, range=3 years, M_{age}=23.5 years, standard deviation (SD)=1.29 years). Of the 15 participants, two (13.3%) had completed a one-year study while the rest (86.7%) had no completed degree.

Throughout the semester the students met with their supervisor Hojjat Daniali for 2 hours weekly. Before doing the coding, they attended lectures from the supervisor and his assistant Stephanie Anna Paoli for three weeks. During this time the students were introduced to NBs and

specifically the characteristics of the four focused on in this project. Dr. Mollie A. Ruben, an Assistant professor of Psychology at University of Maine, were included in one of these lectures. She provided information on NBs and training in how to evaluate them. Following this lecture Ruben shared a coding form she had designed to the students through *Microsoft Teams* relating to the 22 videos. The students then watched every video and answered the form, which would provide coding information later used to research the validity and reliability of the NBs.

Measures

Micro-level NBs. Mollie A. Ruben collected the data from the coders. She made a form where they were asked to code nonverbal behaviors in all 22 videos from the mother project with a Likert scale, which ranges from 1 (not at all) to 9 (extremely). The aim was to find whether the actresses expressed the NB accurately while staying neutral otherwise, as to uphold validity. Each coder included their own name and the name of the video they coded to differentiate themselves from each other. The 8 different coded NBs were as follows: gesture, smile, eye contact, overall impression of positivity, expressivity, attractiveness, friendly/positive tone of voice and dominant and in charge. The three different actresses were told to express one of four NBs in isolation of which were neutral, positive facial expression, positive body movement and positive tone of voice.

Procedures

The study was provided through Microsoft Teams, the main portal used to provide information by supervisor Hojjat Daniali and assistant Stephanie Anne Paoli. The coders answered the form through *docs.google.com* and were told the purpose of the project, which is to test if experienced pain lowers after watching the provided videos. There were no inclusion/exclusion criteria and there was no need for ethical approval.

Statistical Analysis

All data analysis was conducted using IBM SPSS statistics Desktop edition version 28 for Windows. This is a software platform providing advanced statistical analysis. Descriptive analysis was used to get basic information and overview over different variables. To test the reliability one-way ANOVA was used (analysis of variance). ANOVA, used to investigate internal consistency, was used twice. Once to find statistically significant differences between the videos and NBs and secondly to find differences between the actors and NBs. As ANOVA is unable to give specifics to which groups differ significantly a Post Hoc test determined where any differences lay.

Data Screening

The data from the coding forms was prepared through Microsoft Excel where the coders and videos were sorted in a sheet. Another sheet sorted name, age, sex and completed academic degree of the coders. All coders completed the form and there was no need for a normality test.

Online study

Cover story and exposure

Before doing the survey, participants may have been exposed to basic elements of what the bachelor project entails as the survey was shared to friends and family, among others. After participants open the survey, they are informed that the project is investigating the effects of expectations on hypothetical pain. Further they are informed that there will be introduced to a hypothetical situation where they burn their hand. The cover story is as follows: the participant is asked to imagine a hypothetical situation where they burn their hand on a hot frying pain. Abstaining from serious injury, the participant gets a red, swollen mark on their hand with a few blisters and experience intense pain. They look up remedies on the internet and find an over-the-counter pain-relieving cream called Embla, an approved treatment for thermal burns. Its description is provided through a videoclip (one of the four focused on NBs).

Participants

The online study included participants between the ages of 15 and 52 who answered the survey through hearing about it online or in person. Access to the survey was shared through direct messages, posted on social media site *facebook.com*, official student portals *innsida.ntnu.no* and *ntnu.blackboard.com*, as well as physically posted different places at NTNU Dragvoll campus. The study consists of four different surveys, one for each NB (NeB, PBM, PFE, PTV). Recruitment began at the end of February and ended when each survey had 25 responses as per our goal, totaling 100 participants.

There were no expressed exclusion criteria. Inclusion criteria were as follows:

- 18 years of age or older
- Basic understanding of English

The respondents include 67 females (min_{age}=15 years, max_{age}=52 years, range=37 years, M_{age}=25.13 years, standard deviation (SD)=8.36 years) and 33 males (min_{age}=19 years, max_{age}=52 years, range=33 years, M_{age}=25.76 years, standard deviation (SD)=7.77 years). Of the sample 49 respondents (49%) had completed a bachelor's degree or similar. 84 respondents (84%) answered the control question correctly, and these are the only ones included in the analysis to ensure that the respondents included watched the video and completed the questionnaire, as well as fulfilled the inclusion criteria. Thus, the analysis consists of 84 respondents (min_{age}=15 years, max_{age}=52 years, range=37 years, M_{age}=25.60 years, standard deviation (SD)=8.29 years). Of the 84 there are 57 females (min_{age}=18 years, max_{age}=52 years, range=34 years, M_{age}=25.65 years, standard deviation (SD)=8.94 years) and 27 males (min_{age}=21 years, max_{age}=49 years, range=29 years, M_{age}=25.81 years, standard deviation (SD)=6.17 years).

Measures

Sex difference in pain intensity. The students participating in the bachelor's project made a form together gathering the relevant information each group needed for their secondary aim. The form was made on *nettskjema.no* and distributed via different social media and student-relevant portals. The form included questions about sex, age and educations as well as assuring

the respondents that everything was anonymous. It also included questions irrelevant for the secondary aim of this thesis. For this thesis a scale from 0 (no pain) to 10 (worst possible pain) was used before and after watching the four videos of actress 1 to measure whether there is a significant difference in pain intensity experienced by males and females.

Procedures

The students taking the bachelors course made an online study using *nettskjema.no* to collect relevant data for each of the groups. It was distributed via a handful of online platforms; *innsida.ntnu.no* and through social media such as *facebook.com* to reach out to family and friends. The study was also put on posters on campus. The respondents were told that the study on *nettskjema.no* was anonymous and would be used to collect data for our thesis. Before filling out the form, respondents were told the information about what we were doing. Including the purpose of it, why the information was needed, their role and information about privacy and rights. Important to note that they did not know that the pain-reducing cream *Embla* was placebo.

Statistical Analysis

To investigate sex differences collected data from the form on *nettskjema.no* was analyzed using repeated measures ANOVA. The goal was to find any difference for sex before and after watching the video. Mean scores were looked at to find differences in time (dependent variable) and sex (independent variable).

Data Screening

16 of the 100 participants did not pass the control question and these were excluded from the analysis.

Results

Coding study

　　　Reliability analysis testing the answers from the coding form found the Cronbach Alpha values of table 1.

Table 1: Video types

Reliability test for variables across all videos (N=21).	
Variable	Cronbach`s Alpha
Gesture	0.988
Smile	0.989
Eye contact	0.987
Positive tone of voice	0.962
Dominant	0.716
General positivity	0.960
Expressive	0.961

　　　Post hoc test has been used to find where the differences come from. Through table 2, it is observable that all the variables correlate to the wanted NB. This is obvious in the variables with singular channeling, such as PTV.

Table 2: Video types

Post Hoc test for differences in NBs between video types (N=21).										
				Significant difference p for mean difference						
NB	Variable	M	SD	1^p	2^p	3^p	4^p	5^p	6^p	7^p
Gesture	1. Calibration	20.33	1.15	-						
	2. Introduction	21.67	2.52		-					
	3. Pre-test	16.67	0.58			-				
	4. Neutral	19.67	1.15				-			
	5. PBM	99.33	9.07	< 0.001	< 0.001	< 0.001	< 0.001	-		
	6. PFE	19.33	1.15					< 0.001	-	
	7. PTV	17.00	1.00					< 0.001		-
Smile	1. Calibration	24.00	6.56	-						
	2. Introduction	25.33	7.02		-					
	3. Pre-test	22.33	5.86			-				
	4. Neutral	20.00	7.00				-			
	5. PBM	29.00	13.23					-		
	6. PFE	92.67	16.86	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	

Variable	Condition	M	SD	1	2	3	4	5	6	7
	7. PTV	33.33	13.58						< 0.001	-
Eye contact	1. Calibration	45.00	17.44	-						
	2. Introduction	55.67	12.66		-					
	3. Pre-test	42.33	9.29			-				
	4. Neutral	47.00	7.21				-			
	5. PBM	70.67	6.66					-		
	6. PFE	123.67	3.51	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	
	7. PTV	58.67	11.02						< 0.001	-
Positive tone of voice	1. Calibration	49.00	6.08	-						
	2. Introduction	50.33	7.37		-					
	3. Pre-test	51.33	8.39			-				
	4. Neutral	40.33	6.11				-			
	5. PBM	55.33	6.66					-		
	6. PFE	72.67	7.23	0.01	0.05	0.05	< 0.001		-	
	7. PTV	99.00	0.00	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.01	-
Dominant	1. Calibration	42.33	1.15	-						
	2. Introduction	46.00	3.61		-					
	3. Pre-test	42.00	3.46			-				
	4. Neutral	43.67	3.21				-			
	5. PBM	56.33	9.07	0.05		0.05	0.05	-		
	6. PFE	57.00	3.67	0.05		0.05	0.05		-	
	7. PTV	45.33	1.15							-
General positivity	1. Calibration	40.33	8.08	-						
	2. Introduction	42.33	10.02		-					
	3. Pre-test	37.33	7.51			-				
	4. Neutral	32.00	5.20				-			
	5. PBM	56.67	9.61					-		
	6. PFE	79.67	10.26	< 0.001	< 0.001	< 0.001	< 0.001	0.05	-	
	7. PTV	67.33	3.21	0.05	0.05	0.01	0.01			-
Expressive	1. Calibration	27.00	1.73	-						
	2. Introduction	34.00	7.55		-					
	3. Pre-test	32.00	3.46			-				
	4. Neutral	26.33	3.51				-			
	5. PBM	71.33	11.15	< 0.001	< 0.001	< 0.001	< 0.001	-		
	6. PFE	60.67	3.51	< 0.001	0.01	< 0.001	< 0.001		-	
	7. PTV	53.67	4.62	0.01	0.05	0.01	< 0.001	0.05		-

Note. N = number of videos.

The results from the ANOVA testing reliability of NBs between actresses found no significant difference other than the variable *attractiveness*, $p = < 0.001$, which has been excluded as it is not a NB.

Online study

Repeated measures ANOVA used 83 participants unequally distributed across the four NBs performed by actor 1. This ANOVA investigated mean scores of pain intensity across time for the sexes. Of the 83, there was 26 males and 57 females. For example, pre-video females ($n = 14$) had a mean score of 6.50 and males ($n = 6$) a mean score of 5.83 for NeB. Post-video the mean scores for females was 4.00 and males 3.50 for NeB. For females ($n = 15$) the highest change in mean scores was for PFE which changed from 6.60 to 3.80 pre- to post-video. For males ($n = 5$) the highest change in mean scores was for PTV which changed from 6.80 to 4.00 pre- to post-video. The test found no significant difference in how sex affects pain intensity between pre- and post-video, $p = > 0.05$.

Discussion

The primary aim of this study was to find whether the NBs conveyed in the videos from the mother project was acted consistently as well as accurately. When checking for reliability in the seven coded factors all Cronbach's Alpha values was of 0.7 or higher. A coefficient of 0.7 or higher for this value is acceptable in social science research (UCLA). Between the four nonverbal behaviors some of them were more significantly different than the control group (NeB), disregarding calibration, introduction, and pre-test. This appears when it comes to the variables that act on a macro-level, being dominance, general positivity, and expressiveness. PFE and PTV was perceived higher in general positivity, which may be explained by their ability to express positivity more distinctly in isolation than PBM. PTV had no significant difference for dominance compared to PBM and PFE. The reason both PFE and PBM are significantly dominant but only PFE is significantly positive may be attributed to PFEs ability to be noticeable positive through smile as well as dominant qualities such as rigorousness, while PBM may struggle to be obviously positive. PFE is also significantly different to NeB for positive tone of voice. This can be explained by biological factors, as smiling shortens the vocal tract resulting in a higher frequency (Huron, 2015, p. 2). Otherwise, the micro-level variables relate mainly to their connected NB. The results show that the acted NBs were in accordance with the variables coded by the students. When checked for internal consistency there was no significant difference between the actors across all videos, except for attractiveness. Even though the difference in rated attractiveness was significant, it seemingly had no effect on the outcome. This can be

interpreted to say individual characteristic factors did not play a significant role in the perception of NBs, which is highly sought after in this kind of research. The actors managed to convey the NBs in the way they were trained. Thus, the NBs reached a high degree of both validity and reliability.

Micro-level nonverbal behavior can be crucial in the generation of treatment expectations as stated in the introduction but measuring these can be challenging. Blanch-Hartigan, Ruben, Hall and Mast find this in their research article *Measuring nonverbal behavior in clinical interactions: A pragmatic guide*. Their abstract conclusion states "A key to decision-making around nonverbal behavior coding is establishing clear research questions and using these to guide the process" (2018, p. 2219). Exactly this has been achieved during this study. Mollie A. Ruben making the form of which the NBs was coded together with guidance from supervisor Hojjat Daniali and his assistant Stephanie A. Paoli provided a groundwork for the students to conduct research of elevated caliber. Both Daniali and Ruben have previously published articles on NBs and pain adding to the body of research. Daniali found "…three factors capable of altering the perception of pain, and amplitude of placebo/nocebo effects and responses" (Daniali & Flaten, 2019, p. 13). Furthermore, Ruben found supportive nonverbal behavior to decrease objective pain and increase pain tolerance (Ruben et al., 2017, p. 973). So, NBs capability to modulate treatment outcomes is promising, but how NBs can promote specific outcomes is yet to be presented. Such is the goal of the mother project, and with the variables that this thesis has found to be both valid and reliable its research can start.

The secondary aim investigated if there would be any significant difference in perception of pain level between sexes before and after watching a video by one of the actors. The contextual factor for this aim is utterly important. As the scenario is hypothetical and the pain is imagined, the patient is far removed from the provider. Although the analysis found no significant data, which may be explained by a quite small sample size as well as being highly skewed toward females in terms of participation by sex, its results will be used for the sake of discussion. The Tickle-Degnen & Rosenthal article conceptualize rapport and to translate their articles findings to the secondary aim, the method has a hard time to build rapport over a pre-recorded video. There is no social reciprocation, and the "patient"/viewer may or may not be attentive to verbal or nonverbal information being conveyed. As the results showed little

difference in sex and in what NB channel is most effective, one might assume the project is too far removed from the participants its collecting data from.

There was an expectation to find significant differences for the secondary aim. Daniali and Flaten mentioned how men stereotypically may hide their pain from women to impress, while women display higher sensitivity to invoke protectiveness from men (2019, p.2). This was further backed by observations of men's mental health stigma (Chatmon, 2020, p. 1-2) and lack of men in psychology professions (anonymous, 2021). To find a significant difference would be unsurprising, but the scope of the secondary aim probably limits its ability to produce scientific findings as mentioned. Another aspect to point out is how all providers in the mother project were women. A bigger study would benefit from having both men and women as providers with this aim.

In conclusion the thesis is a part of a larger, ongoing project that focus on treatment as more than the curative element. The psychosocial context has part to play in modulating treatment outcomes. To do so, the center of the project in whole has been nonverbal behavior. It is evidently effective in manipulating how pain is perceived, both objectively and subjectively. Through an empirical research method an experimental situation was designed to best fit the situation of which the study was conducted. The coding study provided tangible information which can further be used to find how nonverbal behavior can promote specific outcomes, and hopefully contribute to training medical professionals in the future. Quantitative analysis represents the data of the thesis, but future studies may draw benefit from deep qualitative analysis. Especially regarding male and female feelings toward providers of same and opposite sex. Continuing to scratch the surface of nonverbal behavior can hopefully lead to science enabling a deeper tailoring of patient-provider relationships in the future.

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