Bachelor's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Social and Educational Sciences
Department of Psychology

Candidate number: 10118

Validating Nonverbal Behaviors and Investigating Their Influence on Trust

Bachelor's thesis in Psychology, PSY2900
Supervisor: Hojjat Daniali
May 2022

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Kunnskap for en bedre verden

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Preface

The primary aim of this thesis is part of a larger project to be conducted by our supervisor, Hojjat Daniali. He shared the relevant videos with our bachelor group consisting of 15 students and offered us some starting literature. Besides this, I conducted my own literature search, mainly through Oria and Google Scholar. From Mollie Ruben, we received the form we would use to code the videos, in addition to training in coding of nonverbal behaviors. Individually, all students completed the coding, analyzed the ratings, and interpreted the results. The idea for the secondary aim of this thesis was developed together with two of my fellow students, based on a curiosity related to how nonverbal behaviors may affect our feelings of trust. Together, we created an online survey, gathered participants, and completed the data collection. Individually, we conducted our analyses and interpreted the results. Our supervisor gave us feedback and recommendations regarding both the development and the conduction of the study. Throughout the course, he also provided us with feedback on each written section of our individual theses, which I found very helpful for the further process of writing. I would like to thank Hojjat Daniali for being available to answer any questions throughout this entire process, and for providing valuable advice and feedback. I would also like to thank Stephanie Anne Paoli, for giving informative lectures and advice regarding the writing of a bachelor's thesis.

The bachelor thesis is written in accordance with the guidelines of the Publication Manual of the American Psychological Association 7th edition (American Psychological Association, 2020).

Abstract

Nonverbal behavior plays a significant role in all human communication and is, among other things, of great importance within healthcare. The primary aim of this thesis is to test the validity and reliability of enhanced micro-level nonverbal behaviors, including positive facial expressions, body movements, and tone of voice. 15 coders rated several types of videos containing the various behaviors, and the results of two ANOVA largely supported the hypothesis that these were sufficiently enhanced. The enhanced conditions contained higher levels of their related nonverbal cues compared both to each other, and to neutral scenarios. This demonstrates that nonverbal behaviors can be systematically manipulated and successfully enhanced. Validating such behaviors introduces a way to systematically implement and control these in treatment settings, which may contribute to increase patient satisfaction and facilitate favorable outcomes. For the secondary aim of this thesis, the effects of incongruence between nonverbal channels on trust is investigated. A final sample of 50 participants completed an online survey in which they were randomly assigned to watch a health care provider displaying one of the enhanced nonverbal behaviors or a provider displaying positive nonverbal cues from all relevant channels. Contrary to the hypothesis that the all-positive and congruent condition would receive the highest ratings of trust, the results of an ANOVA indicate that positive facial expressions are the most important nonverbal cues for the formation of trust. However, due to the small sample size of the present study, additional investigations of this relationship are needed.

Validating Nonverbal Behaviors and Investigating Their Influence on Trust

Nonverbal behavior is a fundamental part of human communication and refers to the elements besides spoken words, including tone of voice, gestures, body position, and interpersonal distance (Knapp et al., 2014, p. 4). People gather valuable information about others emotional states, attitudes, and intentions from nonverbal signals, which thus heavily influence interpersonal judgments (Jacob et al., 2016). Nonverbal communication is continuous even in silence and is most often automatic and unconscious (Knapp et al., 2014, p. 4). However, people also deliberately use nonverbal behavior to underline verbal messages, as nonverbal cues can benefit listeners' comprehension of verbal information (Cassell et al., 1999). Nonverbal cues can also help reinforce and expand this information (Silverman & Kinnersley, 2010; Hostetter, 2011), and are often considered as the most reliable source of information in cases of conflicting verbal and nonverbal signals (Vogel et al., 2016). A noticeable absence of nonverbal cues can be interpreted as conveying negative emotions (Said et al., 2009), and whether the display of nonverbal signals is intended or not, interactional partners will draw inferences about their meaning (Blanch-Hartigan et al., 2018).

As in every human interaction, nonverbal behavior plays a significant role in clinical communication. Nonverbal communication is, among other things, considered as a predictor of patient outcomes and clinical effectiveness and helps build the physician-patient relationship (Hall et al., 1995; Silverman & Kinnersley, 2010). The behaviors can be positive or negative, and previous research has shown that negative behaviors such as not looking at patients and keeping a greater distance can decrease patient satisfaction (Daniali & Flaten, 2019). On the other hand, positive behaviors such as smiling and keeping a smaller distance has been shown to increase both patient satisfaction and understanding (Mast, 2007). High-quality care is said to be characterized by emotion-related communication skills, including sending and receiving nonverbal information (Roter et al., 2006), and high nonverbal support from clinicians has been shown to have a positive effect on patients' pain tolerance (Ruben et al., 2017). Moreover, physicians' positive nonverbal behaviors facilitate stronger placebo effects (Daniali & Flaten, 2019), which refers to the positive effects of treatment expectations on the experience of certain symptoms (Flaten, 2006).

Nonverbal behavior appears to have many and impactful effects on various aspects within healthcare. Previous research has largely focused on the impacts of macro-level nonverbal behaviors, which refer to collections of micro-level behaviors conveying a psychological state, such as discomfort, confidence, or excitement (Blanch-Hartigan et al.,

2018). Less is known about the effects of specific behaviors on micro-level, such as smiling or eyebrow movement. This highlights the importance of the primary aim of this thesis, which is part of a larger project where the effects of positive nonverbal behaviors on micro-level will be tested on experimentally induced pain. In the larger project, videotaped experimenters will overexpress various nonverbal behaviors in different conditions, while reducing their other behaviors and keeping these neutral. Across the different conditions, the experimenters will convey the same verbal information while guiding participants through the pain procedure and introducing a placebo cream meant to relieve heat pain. The differences between test groups' results will be assumed to be attributable to the various enhanced nonverbal behaviors. As it is close to impossible to reduce nonverbal channels completely, it should therefore be ascertained that the different behaviors to be tested are in fact different.

The primary aim of this thesis is to test the validity and reliability of the enhanced nonverbal behaviors. This will be achieved through coding and is important to ensure that the future results reflect the true effects of these behaviors. Uncovering these effects may contribute to a better understanding of the predictors and consequences of different micro-level nonverbal behaviors, and of how people are affected by the nonverbal cues of others. Moreover, testing the validity of nonverbal behaviors is of importance as it introduces an approach to systematically control some of the non-specific factors in treatment settings, such as the nonverbal behavior of health care providers. This might enable systematic implementation of various behaviors to facilitate favorable treatment outcomes and will also contribute to improve patient care. Greater knowledge of how nonverbal behavior can affect the experience of pain and other symptoms may also influence the teaching, research, and practice of clinical communication. The behaviors to be coded are positive facial expressions, tone of voice, and body movements, and the hypothesis is that these micro-level nonverbal behaviors are sufficiently enhanced.

In everyday life, isolated nonverbal behaviors are combined to form impressions of others, and it is shown that a mismatch between certain nonverbal signals can lead to an emotional conflict in the perceiver (Watson et al., 2013). However, not much is known of how such a mismatch may affect people's general impressions of others. The secondary aim of this thesis will deal with how incongruence between different nonverbal channels affect people's macro-level impressions of trustworthiness. In this case, congruence is conceptualized as similarity and coherence between different nonverbal behaviors. Nonverbal channels that similarly and simultaneously convey positive cues are considered congruent, while nonverbal channels that convey cues of different valence are considered incongruent.

Trust is an important factor in physician-patient relationships and is shown to have a positive effect on patient satisfaction and perceived quality of healthcare (Chandra et al., 2018). The present study might lead to a greater understanding of the human tendency to evaluate others based on nonverbal cues, and of how micro-level nonverbal behaviors might influence the formation of trust. This may be valuable for the purpose of improving physician-patient relationships, which in turn may facilitate beneficial treatment outcomes. Participants will be recruited to watch different videos in an online survey, featuring a health care provider displaying various nonverbal behaviors while explaining an experimental procedure. Three participant groups will watch videos in which the provider's nonverbal behaviors are incongruent, while the fourth group will be presented for a health care provider meant to appear as warm and friendly by displaying all-positive and congruent behaviors. How does incongruence between nonverbal channels affect people's trust in a health care provider? The hypothesis is that the warm and friendly condition containing congruent behaviors will receive higher ratings of trust compared to the conditions containing incongruent nonverbal behaviors.

Primary aim

Methods

Coders

The group of coders ($N = 15$) consisted of 11 females (73%) and four males (27%), with age ranging from 21 to 25 ($M = 22.80$, $SD = 1.28$). They were all studying psychology at the Norwegian University of Science and Technology (NTNU), and most had no previously completed degree ($n = 12$). The coders received lectures on nonverbal behavior from Hojjat Daniali, who also presented the videos to be coded. Mollie Ruben is an Assistant Professor of Psychology at the University of Maine who, among other things, researches nonverbal behaviors. In a digital meeting, the coders received further training from Dr. Ruben, who explained what coding of different nonverbal channels entails. Dr. Ruben also clarified what were expected of us as coders and presented the form we would use in the coding process. We watched some of the relevant videos together before talking through the form, and a reliability check of the coders' initial ratings indicated no need for additional meetings with Dr. Ruben.

Procedure

Actors

For the larger project the primary aim of this thesis is part of, three female actors were recruited to act as health care providers conducting a heat pain experiment. The actors were trained to convey three sets of enhanced nonverbal behaviors, namely positive facial expressions, tone of voice, and body movements, in addition to neutral behaviors. The training was supervised by an expert in the field of nonverbal communication and consisted of 10 hours of acting out nonverbal scripts. The recruited actors were all Caucasian, slim, not looking too young, and a little higher than average. After completing the training, they were recorded displaying the various behaviors wearing white lab coats and light makeup, with their hair pulled away from their faces.

Excerpts of Nonverbal Behavior

Excerpts from different phases of the full videos to be used in the mother project were extracted. These included preconditioning phases of introduction, calibration, and pretest, in addition to conditioning phases of positive facial expressions, positive body movements, and positive tone of voice. A neutral condition was also included as a control. This resulted in 21 excerpts, divided into seven different video types accounting for the various phases. Each video type consisted of three videos, in which each actor displayed the same nonverbal cues. The conditioning phases involved the same verbal information, and the only thing that differed between them was thus the nonverbal behaviors. About a minute from the beginning, a minute from the middle, and a minute from the end of the original videos were extracted, causing each excerpt to last about three minutes. Previous studies have shown that brief segments or "thin slices" of nonverbal communication can represent an individual's behavior across a longer length of time (Murphy, 2005). Slices of one to three minutes has also been shown to be enough to gather valid information and to achieve representativeness through coding of nonverbal behavior (Ambady & Rosenthal, 1992; Murphy et al., 2014; Blanch-Hartigan et al., 2018).

Videotaped experimenters have been used successfully to convey nonverbal information in previous studies (e.g., Ambady et al., 2002; Ruben et al., 2017). In the mother project, participants will interact with two videotaped health care providers each, to control for variability in the actors' display of nonverbal behaviors. Through the introduction, calibration, and pretest, the participants will be presented with a provider giving information about the experiment's general procedures while displaying neutral nonverbal behaviors.

During the conditioning phase, the participants will be presented with a provider either enhancing positive facial expressions (PFE), positive body movements (PBM), or positive tone of voice (PTV), or with a provider also displaying neutral nonverbal behaviors. This provider will give further information about the experimental procedure and present a placebo cream for heat pain.

Development of Nonverbal Conditions

In the condition of positive facial expressions, the health care providers frequently nodded and smiled, had more positive eyebrow movements and affirmative blinking, and looked directly at the camera for more than five minutes throughout the interaction. In the condition of positive tone of voice, the providers spoke with a warm, friendly, energetic, and expressively loud tone of voice. In the condition of positive body movements, the providers frequently leaned forward, kept a smaller distance to the camera (about half a meter), and displayed expressive and elaborate hand movements. The latter included numerical listings with the fingers and using the hands to simulate sizes and timelines. In both the introduction, calibration, pretest, and neutral condition, the providers did not look much at the camera, kept a standard distance of one meter, maintained a flat and plain face, spoke with a monotonous tone of voice, and did not move their hands nor body. As previously mentioned, the actors were trained to enhance specific nonverbal behaviors in different conditions, while reducing and keeping other channels as neutral as possible. In the neutral condition, as well as in the introduction, calibration, and pretest, all channels were reduced. A video featuring an actor conveying positive nonverbal cues from all channels simultaneously was also rated by the coders but was not related to the primary aim of validating nonverbal behaviors.

Measures

An eight-item nonverbal rating scale developed by Mollie Ruben was used to rate the various nonverbal behaviors. The coders were asked to rate the amplitude of the different behaviors on scales ranging from “1” (not at all) to “9” (extremely). The items included gesture, smile, eye contact, friendly/positive tone of voice, dominant and in charge, overall impression of positivity, expressiveness, and attractiveness. The aim was to create reliable codes for the different micro-level nonverbal behaviors, for the purpose of examining whether these were displayed the way they were meant to. The training supervised by Dr. Ruben gave the coders an understanding of both what each item entailed and of what should be considered while rating the various phases. Ratings of eye contact should for an example be based on impressions of how much time the videotaped actors spent looking down versus at the

camera, while ratings of expressiveness should be based on how much they moved, and of how animated and intense they seemed to be. Dominance should in turn encompass whether the videotaped actors seemed to know what they were talking about and if they seemed to be in charge. Even though micro-level nonverbal behaviors were the focus of the coding, a general impression approach was used to rate them. This involved paying attention to both visual and auditory cues but did not involve objective measures such as frequency and/or duration of specific behaviors. A challenge associated with such a general impression approach is to know what represent a "1" and what a "9" on the rating scales (Blanch-Hartigan et al. 2018). However, this was clarified during the training provided by Dr. Ruben.

Statistical Analysis

The data was analyzed using IBM SPSS (Statistical Package for the Social Sciences) version 28.0. First, the descriptive statistics were investigated, before Cronbach's alpha was computed for every item to check the inter-reliability of the coders' ratings. Then, Levene's test and both Kolmogorov-Smirnov and Shapiro-Wilk test was conducted to check for homoscedasticity and normality, respectively. One-way analysis of variance (ANOVA) was used to compare the coders' ratings on the different items between both the different video types and the different actors. The sums of the coders' ratings on each item were entered as the dependent variables, while video type and actor were entered as the factor in two separate ANOVA. Due to a larger number of comparisons, Tukey's HSD post hoc test was conducted to locate the differences and similarities between the different phases. Due to fewer comparisons, an LSD post hoc test was conducted to investigate potential differences and similarities between the actors.

Data Screening and Pre-Processing

Eight new variables were computed based on the sum of the ratings on each coding item, in addition to a variable accounting for the seven different video types. Levene's test was non-significant, $p > .05$, for all coding items except for gesture, $p = .012$, indicating that most items had equal variance. The coders' ratings were assumed to vary greatly depending on the specific nonverbal cues present in each video. Therefore, it was not necessary to check for outliers. The Kolmogorov-Smirnov and Shapiro-Wilk test were both significant, $p < .05$, for all items except for overall impression of positivity. This indicated that most of the dependent variables for the ANOVA was not normally distributed, which was supported by visual inspections of histograms. However, this was not a source of concern, as ANOVA is

known to be robust to non-normal distributions despite normality being one of its basic assumptions.

Results

Inter-Coder Reliability

Cronbach's alpha was computed for every item as a measure of internal consistency. The results are displayed in Table 1, showing acceptable values for all eight coding items, $\alpha > .80$ (Field, 2018, p. 829). The ratings of the video featuring positive nonverbal cues from all channels were included in the reliability test, but not in other primary analyses.

Table 1

Cronbach's Alphas for all Items in the Coding Form

Item	α
Gesture	.99
Smile	.99
Eye contact	.99
Positive tone of voice	.97
Dominance	.83
General positive impression	.98
Expressiveness	.98
Attractiveness	.97

Descriptive Statistics

The means and standard deviations of the coders' ratings are shown in Table 2, demonstrating that the PTV received the highest ratings of positive tone of voice, while the PBM received the highest ratings of gesture and expressiveness. In turn, the PFE received the highest ratings of both eye contact, smile, dominance, and overall impression of positivity.

Table 2

*Descriptive Statistics for the Coders' Ratings of Videos (*N *= 21)*

Video type	Gesture *M* (*SD*)	Smile *M* (*SD*)	Eye contact *M* (*SD*)	PTV *M* (*SD*)	Dominance *M* (*SD*)	Positive impression *M* (*SD*)	Expressiveness *M* (*SD*)
Introduction (*n* = 3)	21.67 (2.52)	25.33 (7.02)	55.67 (12.66)	50.33 (7.37)	46.00 (3.61)	42.33 (10.02)	34.00 (7.55)
Calibration (*n* = 3)	20.33 (1.15)	24.00 (6.56)	45.00 (17.44)	49.00 (6.08)	42.33 (1.15)	40.33 (8.08)	27.00 (1.73)
Pretest (*n* = 3)	16.67 (0.58)	22.33 (5.86)	42.33 (9.29)	51.33 (8.39)	42.00 (3.46)	37.33 (7.51)	32.00 (3.46)
PTV (*n* = 3)	17.00 (1.00)	33.33 (13.58)	58.67 (11.02)	99.00 (0.00)	45.33 (1.15)	67.33 (3.21)	53.67 (4.62)
PFE (*n* = 3)	19.33 (1.15)	92.67 (16.86)	123.67 (3.51)	72.67 (7.23)	57.00 (3.61)	79.67 (10.26)	60.67 (3.51)
PBM (*n* = 3)	99.33 (9.07)	29.00 (13.23)	70.67 (6.66)	55.33 (6.66)	56.33 (9.07)	56.67 (9.61)	71.33 (11.15)
Neutral (*n* = 3)	19.67 (1.15)	20.00 (7.00)	47.00 (7.21)	40.33 (6.11)	43.67 (3.21)	32.00 (5.20)	26.33 (3.51)

Note. PTV: positive tone of voice. PFE: positive facial expressions. PBM: positive body movements. *M* (*SD*) represent mean and standard deviation, respectively.

Differences and Similarities Between Nonverbal Conditions

To compare the coders' ratings between the various video types, a one-way ANOVA was conducted. Post hoc comparisons were conducted using Tukey's HSD test. The PBM contained significantly higher levels of gesture, $F(6, 14) = 206.09$, $p < .001$, compared to both the preconditioning phases, $\Delta M = 82.67$, $p < .001$, and to the other phases of conditioning, $\Delta M = 82.33$, $p < .001$. The PFE received significantly higher ratings of smile, $F(6, 14) = 16.93$, $p < .001$, compared to the other phases of conditioning, $\Delta M = 72.67$, $p < .001$, and to the preconditioning phases, $\Delta M = 70.33$, $p < .001$. The PFE also contained significantly higher levels of eye contact, $F(6, 14) = 21.60$, $p < .001$, compared to both the preconditioning phases, $\Delta M = 81.33$, $p < .001$, and the other phases of conditioning, $\Delta M = 76.67$, $p < .001$. Furthermore, the PTV received significantly higher ratings of positive tone of voice, $F(6, 14)$

= 28.16, $p < .001$, compared to the other phases of conditioning, $\Delta M = 58.67$, $p < .001$, and to the preconditioning phases, $\Delta M = 50.00$, $p < .001$. The PFE received significantly higher ratings of positive tone of voice compared to all video types except for the PBM, $p < .05$.

The main effect of dominance, $F(6, 14) = 6.48$, $p = .002$, was due to the PFE being perceived as significantly more dominant compared to the pretest, calibration, and neutral condition, $\Delta M = 15.00$, $p = .012$. Compared to the above-mentioned video types, the PBM also received significantly higher ratings of dominance, $p < .05$. The PFE received significantly higher ratings of overall impression of positivity, $F(6, 14) = 14.22$, $p < .001$, compared to all other video types except for the PTV, $\Delta M = 47.67$, $p < .001$. In turn, the PTV received significantly higher ratings of positivity compared to the introduction, calibration, pretest, and neutral condition, $p < .05$. Both the neutral condition and all the preconditioning phases received significantly lower ratings of expressiveness, $F(6, 14) = 28.34$, $p < .001$, compared to the PBM, $\Delta M = 45.00$, $p < .001$, PFE, $\Delta M = 34.33$, $p < .001$, and PTV, $\Delta M = 27.33$, $p < .001$. No significant difference between the video types was found in relation to attractiveness, $F(6, 14) = 0.00$, $p = 1.00$.

Differences and Similarities Between Actors

A one-way ANOVA revealed a significant difference in ratings of attractiveness between at least two actors, $F(2, 18) = 3367.39$, $p < .001$. The means and standard deviations are shown in Table 3. An LSD post hoc test further revealed that actor 1 received significantly higher ratings than actor 3, $\Delta M = 34.29$, $p < .001$. Actor 1 also significantly differed from actor 2, $\Delta M = 13.71$, $p < .001$, who in turn received significantly higher ratings of attractiveness than actor 3, $\Delta M = 20.57$, $p < .001$. No further differences were found.

Table 3

Descriptive statistics of the Coders' Ratings of Attractiveness

Actor	*M*	*SD*
1	86.71	0.76
2	73.00	0.00
3	52.43	1.13

Note. M: mean. *SD*: standard deviation.

Discussion

Enhanced Nonverbal Behaviors

The results demonstrated that the PBM, PTV, and PFE all received significantly higher ratings of their related nonverbal cues compared both to each other, and the introduction, calibration, pretest, and neutral condition. Compared to these video types, all three enhanced conditions also received significantly higher ratings of expressiveness. Interesting findings emerged in relation to positive tone of voice, as also the PFE received high ratings and signifianctly differed from all video types except for the PBM in this aspect. The PFE and the PBM received significantly higher ratings of dominance compared to the introduction, calibration, pretest, and neutral condition. Compared to these video types, both the PFE and the PTV were also rated as significantly more positive. In turn, the PBM received significantly lower ratings than the PFE, and were only rated as significantly more positive than the neutral condition.

The finding that each enhanced condition contained significantly higher levels of their related nonverbal cues compared to both each other and all scenarios containing neutral behaviors is important. This demonstrates that the enhanced conditions displayed the nonverbal cues they were meant to, and that these behaviors were sufficiently reduced in the introduction, calibration, pretest, and neutral condition. These findings largely support the hypothesis that the enhanced behaviors were indeed sufficiently enhanced. The PFE, PTV, and PBM should have involved more movement and expressive talking compared to the types of videos containing neutral behaviors. This was shown to indeed be the case, as the enhanced conditions all received significantly higher ratings of expressiveness compared to the introduction, calibration, pretest, and neutral condition. Building on these results, the actors' training seems to have been effective and succeeded in standardizing the various behaviors. Furthermore, the results demonstrate that nonverbal behaviors can be validated and systematically manipulated, and that it is possible to successfully enhance micro-level nonverbal behaviors. This might have important implications for healthcare, by indicating that it may be possible to systematically implement enhanced nonverbal behaviors in treatment settings. In turn, this may contribute to improve patients' experiences of health care and facilitate beneficial treatment outcomes.

As to why both the PTV and the PFE received high ratings of positive tone of voice, previous research has demonstrated that the physical properties of some facial expressions, mainly smiles, lead to an alteration of the vocal tract that causes people's tone of voice to change (Tartter, 1980; Campanella & Belin, 2007). This is often referred to as "happy talk" or

a “smiling voice” and demonstrates an interface between facial and vocal nonverbal cues. The mere act of displaying positive facial expressions in the PFE might have altered the actors’ tone of voice and caused it to be rated as more positive. This would have been a problem if the PTV had not received significantly higher ratings of positive tone of voice than the PFE. Moreover, the PFE contained significantly higher levels of both eye contact and smile than the PTV, and it therefore seems that these two conditions were sufficiently distinguished from each other, despite the overlap of positive tone of voice. This overlap, however, indicates that the task of enhancing and reducing this specific nonverbal channel was particularly challenging.

The finding that both the PFE and the PBM received high ratings of dominance is in line with previous research suggesting that speakers with a lot of body movements (Koppensteiner et al., 2016) and happy facial expressions in two-person interactions are perceived as highly dominant (Knutson, 1996; Ueda & Yoshikawa, 2018). Both the PFE and the PBM received significantly higher ratings of dominance compared to all types of videos containing neutral nonverbal behaviors, except for the introduction. This suggests that the introduction somehow differed from the others, which may be related to the specific verbal information given in this phase. As previously mentioned, the enhanced conditions were shown to sufficiently differ from all videos containing neutral behaviors, including the introduction, regarding their specific nonverbal cues. Therefore, the present finding does not seem to have impacted the purpose of validating said conditions. In relation to dominance, the PTV did not significantly differ from any other video type. This suggests that the nonverbal cues involved in the PFE and the PBM are the ones most important for the assessment of dominance. Further investigations of these relationships are of interest and may lead to an identification of the specific nonverbal behaviors related to general traits such as dominance.

The PFE, PTV, and PBM contained enhanced positive nonverbal behaviors, and would therefore have been expected to receive higher ratings of positivity compared to the introduction, calibration, pretest, and neutral condition. The PFE and PTV were both perceived as significantly more positive compared to the above-mentioned video types, while the PBM, on the other hand, only received significantly higher ratings than the neutral condition. Prior studies have suggested that happiness is the easiest emotion to distinguish in facial expressions compared to negative emotions, while being one of the most difficult to recognize through body movements alone (e.g., Goeleven et al., 2008; de Gelder & Van den Stock, 2011). The greater difficulty associated with recognizing happiness in body movements may together with the notion that positive emotions are easy to recognize in facial

expressions be a possible explanation for why the PFE was rated as significantly more positive than the PBM, despite them both displaying positive nonverbal cues. It is possible that positive emotions in general are hard to convey through isolated body movements, and that this affected the coders' ability to derive positivity from the PBM. However, the PBM receiving significantly higher ratings of positivity than the neutral condition indicates that the PBM to some extent was perceived as positive. Furthermore, it is important to note that neither the introduction, calibration, pretest, or neutral condition received higher ratings of positivity compared to any of the enhanced conditions, despite the PBM not significantly differing from most of them. This suggests that the scenarios meant to contain neutral behaviors indeed was perceived as neutral.

Actors

The various actors received significantly different ratings of attractiveness. The "halo effect" refers to the tendency to assume that attractive people possess more socially desirable traits than those who are deemed less attractive (Dion et al., 1972; Forgas & Laham, 2017, p. 276). The actor who received the highest ratings of attractiveness might also have received higher ratings on other items as a result of this. However, no difference was found between the actors' display of the enhanced nonverbal behaviors, indicating that such a "halo effect" did not noticeably affect the coding process. Moreover, this supports the idea that the behaviors were successfully standardized through training and suggests that the present results can be attributed to the behaviors themselves and not to the actors' individual characteristics.

Secondary aim

Methods

Procedure

Randomization

We developed four different versions of an online survey using "Nettskjema", with the aim of measuring participants' feelings of trust in a health care provider. The only thing that differed between the versions was the included video, and whether this featured a warm and friendly health care provider displaying positive and congruent nonverbal cues, or a provider displaying enhanced positive facial expressions, body movements, or tone of voice. The survey link had a randomization function, which ensured that the version and video each participant received was random. Neither the participants nor we thus knew which nonverbal

behavior each of them was exposed to. The randomization resulted in a somewhat even distribution into four participant groups. For reliability purposes, the videos chosen to be included in the surveys were some of the ones coded for the primary aim of this thesis. The warm and friendly condition was also coded but was not directly related to the primary aim.

Survey

Information attached to the survey stated that participation was voluntary and anonymous, and that the present study followed the privacy guidelines of the Norwegian Centre for Research Data (NSD). The survey also included information about the purpose of the present study, in addition to the contact information of our supervisor should any questions arise. The participants provided their informed consent, before answering demographic questions. Then, they were asked to watch the included video on an occasion where they were able to watch it with sound on. After completing the video, the participants answered a control question, before rating the health care provider present in the video. The survey could be completed on all browsers on computers and mobile phones but did have a slight issue with displaying the videos on phone screens. This was stated in the survey. To avoid having to take different actors' characteristics into account, one actor was chosen to be featured in all four videos.

Sampling

Using a convenience sampling strategy, the survey link was distributed to acquaintances, friends, and family through social media such as Facebook Messenger and Snapchat. The survey requested information about sex, age, education level, and English skills, but did not collect any personal data. The participants were informed that the goal of the study was to investigate "people's impressions of digital health care providers", for the purpose of gaining a better understanding of the effects of technological innovation on communication within the healthcare system. This worked as a partial cover story, as the full-fledged purpose of the present study is to investigate the effects of incongruent nonverbal behaviors on impressions of trustworthiness. If the full extent of the study had been known, the participants might have made conscious efforts to distinguish the provider's different nonverbal cues. This could potentially have disrupted the collection of their sincere impressions.

Participants

The participants initially included 43 females (68%), 18 males (29%), and two identifying as "other" sex (3%), with age ranging from 18 to 61 (M = 26.57, SD = 10.19).

They all completed the anonymous online survey from 1 March 2022 to 28 March 2022. The exclusion criteria were being under the age of 18 and not being able to understand English, however, participants identifying as "other" sex was also not included in the analysis due to the low number (n = 2). In addition to this, we removed those who failed to answer the control question correctly (n = 11), as this indicated inattentiveness. The videos included in the survey lasted about three minutes, and it was therefore decided that participants spending less time than this on completing the entire survey should also be excluded. This applied to one respondent. Therefore, a total sample size of 50 participants with age ranging from 19 to 61 (M = 27.48, SD = 10.89) was included in the analysis. The participants were randomly assigned to one of four groups, namely PFE (n = 12), PTV (n = 12), PBM (n = 13), or warm and friendly (n = 13). Of the total sample, 68 % (n = 34) were female and 32% (n = 16) were male. Regarding education level, 23 (46%) of the participants had either started or completed a bachelor's degree, while 12 (24%) had started or completed a degree equivalent to a master's or a PhD. Those who were currently undertaking or had previously completed a one-year study accounted for 10% (n = 5) of the sample, while those who had either completed or were currently in high school accounted for 18% (n = 9). One (2%) participant had completed 10 years of school.

Measures

Trust

The participants' trust in the health care provider was measured by the Individualized Trust Scale (ITS), a 15-item semantic differential-type instrument recommended as a measure of trust (Wheeless & Grotz, 1977). Various characteristics working as indicators of trust were presented in semantic pairs such as "honest/dishonest", "respectful/disrespectful", "safe/dangerous", "sincere/insincere", "trustworthy/untrustworthy", and "deceptive/candid". To make it easier to comprehend what each characteristic entailed, we added definitions based on the Cambridge Dictionary and the Oxford English Dictionary. For an example, for "deceitful" we added the definition of "dishonest or hiding the truth", while the definition of "kind and helpful" was added for "benevolent". This did not change the main structure of the scale. The participants were asked to rate their impressions in each semantic pair from one to seven, with the opposing characteristics placed at each end. We alternated between which end the positively and negatively charged characteristic was placed at. Reliability measures of .94 (Chamberlin, 2000), .92 (Foubert & Sholley, 1996), and .94 (Chamberlin, 2009) have been reported for the ITS. Cronbach's alpha for the use of the scale in the present study was .94,

demonstrating that the 15 items were highly reliable. The ITS is based on more general impressions rather than ratings of specific behaviors. By using this measure, the participants' feelings of trust thus became evident through their judgments of the provider's more general characteristics. This enabled us to investigate how micro-level nonverbal behaviors may unconsciously affect the formation of trust.

Demographic Questions

The participants answered questions asking about their sex, age, education level, and understanding of English. The options for education were: "less than 10 years of school", "10 years of school", "13 years of school (high school)", "one-year study", "bachelor", and "master/PhD or equivalent". The options for sex were: "female", "male", and "other". In terms of the participants' understanding of English, a yes/no question was included. The participants' trust in the health care provider was as previously mentioned measured by 15 items. In total, the survey consisted of 21 questions, also including a question of consent and a control question to ensure that the participants watched the entire video. All questions and videos were in English.

Ethics

The survey was developed in accordance with the guidelines of the Norwegian Centre for Research Data (NSD) regarding anonymity, and the study was conducted in line with common ethical principles for research involving human subjects, e.g., the Declaration of Helsinki (World Medical Association, 2013). All participants provided their informed consent to participate, and identification is not possible. Therefore, no ethical approval was needed.

Statistical Analysis

IBM SPSS Statistics version 28.0 was used to analyze the data. The descriptive statistics were first investigated, before the assumptions for a one-way ANOVA were checked (see the next section). The reliability of the items in the ITS was tested, before a one-way ANOVA was conducted to compare the participant groups' ratings of trust. Group was entered as the factor, while trust worked as the dependent variable. Due to an assumption of equal variance and minor differences between the size of the participant groups, a Gabriel's post hoc test was conducted to investigate between which groups potential differences and similarities lay (Field, 2018, p. 550).

Data Screening and Pre-Processing

There were no missing values, but as previously mentioned, it was necessary to remove more participants than what the exclusion criteria suggested. The additional

exclusions (n = 13) were first removed manually, before the negative items from the ITS was manually reversed. The reliability of the items was checked through Cronbach's alpha, demonstrating a high level of internal consistency, $\alpha = .94$. Then, a variable of trust based on the mean of the participants' ratings was computed. No outliers were found through visual inspections of box plot. The Kolmogorov-Smirnov and Shapiro-Wilk test both showed no evidence of non-normality, $p > .05$. Together with calculations of skewness and kurtosis values and visual inspections of histograms and Q-Q- plots, this led to the assumption of normality to be met. Levene's test was non-significant, $p > .05$. Together with visual inspections of P-P-plots and descriptive statistics, this led to the assumption of homoscedasticity to also be met. The four participant groups were all nearly equal in size and independent due to the design of our study, and all the basic assumptions of a one-way ANOVA (i.e., normality, homoscedasticity, and independence) was thus met.

Results

To compare the ratings of trust, a one-way ANOVA was conducted. The means and standard deviations of the ratings are shown in Table 4. The main effect of trust, $F(3, 46) = 3.67$, $p = .019$, $\eta^2 = .19$, was due to the condition of positive facial expressions receiving significantly higher ratings than the condition of positive tone of voice, $\Delta M = 1.37$, $p = .016$. No statistically significant difference was found in relation to the warm and friendly condition nor the condition of positive body movements, $p > .05$. The coders' ratings of the warm and friendly condition are shown in Table 5. No analysis was conducted to compare these with the ratings of the enhanced conditions (see Table 2, primary results section), and whether these ratings significantly differed is therefore not certain.

Table 4

*Descriptive Statistics for Participants' Ratings of Trust (*N = *50)*

Group	*n*	*M*	*SD*	95% CI
PFE	12	4.96	1.05	[4.30, 5.63]
PTV	12	3.59	0.82	[3.07, 4.11]
PBM	13	3.92	0.96	[3.34, 4.50]
Warm and friendly	13	4.24	1.34	[3.43, 5.04]

Note. PTV: positive tone of voice. PFE: positive facial expressions. PBM: positive body movements. *M*: mean. *SD*: standard deviation. CI: confidence interval.

Table 5

Means of Coders' Ratings of Warm and Friendly

Condition	Gesture	Smile	Eye contact	PTV	Dominance	Positive impression	Expressiveness
Warm and friendly	112.00	108.00	123.00	108.00	79.00	119.00	118.00

Note. PTV: positive tone of voice.

Discussion

Contrary to the hypothesis that the warm and friendly condition would elicit the highest ratings of trust, the health care provider displaying enhanced positive facial expressions was rated as the most trustworthy. The results further showed that the condition of positive tone of voice received significantly lower ratings than the PFE. As the rating scale in the ITS ranged from one to seven, its middle value was four. The mean of trust for all participant groups can therefore be said to be somewhat good, as they all close to this value (see Table 4).

The finding that the PFE received the highest ratings of trust is interesting, especially considering that the warm and friendly condition received such high ratings on all coding items from the primary aim (see Table 5). This either indicates that the nonverbal behaviors in the PFE was not incongruent, or that incongruence does not affect people's feelings of trust to the degree assumed in advance. As mentioned in the primary discussion, prior research has demonstrated that certain facial expressions lead to an alteration of the vocal tract, causing people's tone of voice to change (Tartter, 1980; Campanella & Belin, 2007). The higher levels of smiling in the PFE might have affected the health care provider's tone of voice, causing her nonverbal channels to appear more congruent in this condition compared to the PTV and the PBM. In turn, this might have had a positive effect on the participants' feelings of trust in relation to the PFE. Greater ratings of trustworthiness have in previous research been associated with increased smile intensity (Schmidt et al., 2012). Prior research has also suggested that smiling people often are liked and evaluated more positively than non-smiling people (Lau, 1982). This indicates that people generally prefer and are more inclined to trust those who smile more, which the present findings largely support. However, the warm and friendly condition also contained a lot of smiling, which makes it harder to deduce why the

PFE still received the highest ratings of trust. It might be that the participants' preferences of a health care provider's behavior corresponded the most with the PFE, and an investigation of the participants' prior biases would therefore have been beneficial. Another possible explanation is that enhanced facial expressions have a greater effect on feelings of trust compared to the simultaneous display of positive cues from all nonverbal channels. This further suggests that enhancing a nonverbal channel does not produce incongruence, and that if it does, this does not affect people's feelings of trust in a health care provider.

Regarding why the PTV received the lowest ratings of trust, previous research has highlighted the importance of consistency between verbal and nonverbal cues (e.g., Cassell et al., 1999; Hostetter, 2011; ten Brinke & Weisbuch, 2020). It might be that the enhanced positive tone of voice led the verbal information in the PTV to be received more positively, and therefore caused this to seem inconsistent with the reduced nonverbal cues from the face and body. In turn, this might have negatively impacted the participants' feelings of trust. However, the mean of trust for the PTV was fairly good, indicating that also this provider was perceived as somewhat trustworthy. Despite this condition receiving significantly lower ratings than the PFE, this supports the idea that enhancing a nonverbal channel does not cause incongruence. Had any provider's nonverbal channels been significantly incongruent, the ratings of trust for the enhanced conditions would most likely have been lower. Building on the primary finding that both the PFE and the PTV received high ratings of positivity, it would have been reasonable that these conditions also received high ratings of trust. As this was not the case, positive facial expressions seem to be the most important nonverbal cues in the generation of psychosocial concepts such as trustworthiness, and especially for the formation of trust in a health care provider.

The primary results demonstrated that the PBM received significantly higher ratings of gesture than all the other enhanced conditions. Some previous research has suggested that speakers displaying expansive body movements and high levels of body activity are rated low on trustworthiness (Koppensteiner et al., 2016). It might be that the lack of body movements in the PFE had a positive effect on the participants' feelings of trust, and that the presence of body movements in the warm and friendly condition was a contributor to this condition not receiving the highest ratings. However, this is partly contradicted by the fact that the mean of trust for each participant group was good, indicating that neither of the enhanced conditions contained high levels of incongruence. This further suggests that the present findings are a result of the positive effect of enhanced facial expressions on trust, and not so much a result of the presence or absence of other nonverbal cues. Further research on the impact of positive

facial expressions on trust will be beneficial and may lead to a greater knowledge of what promotes trust in others. This might in turn be of importance within healthcare, for the purpose of improving physician-patient relationships.

General Discussion

The primary results demonstrated that the enhanced conditions displayed the nonverbal cues they were meant to, which justifies our use of the PFE, PBM, and PTV for the secondary aim. Furthermore, the primary findings indicate that the secondary results reflect the true effect of the enhanced behaviors on trust. The warm and friendly condition also seem to have contained the behaviors it should, as evidenced by the coders' high ratings on all items in relation to this. Considering the above, it seems that the actors' training largely enabled them to enhance and reduce various nonverbal channels, demonstrating that this is even possible. However, the overlap of positive tone of voice between the PFE and the PTV may as previously mentioned indicate that the task of reducing this specific nonverbal behavior is challenging.

The primary and secondary findings that ties positive facial expressions to high levels of both positivity, dominance, and trust can all be said to be of relevance within healthcare. The possible benefits that can be gained from systematically implementing enhanced facial expressions in clinical communication are many and may, among other things, increase patients' trust in their physician. In turn, this may improve patient satisfaction and increase their perceived quality of healthcare (Chandra et al., 2018), which highlights the value of further investigations of the relationships between positive facial expressions and perceived positivity, dominance, and trust. Finally, the results of both the primary and the secondary aim of this thesis can be said to support prior evidence showing that nonverbal behaviors highly influence our judgments of others and is considered as a reliable source of information all on its own (Jacob et al., 2016; Vogel et al., 2016). The verbal information across the enhanced conditions was consistent, meaning that the only thing that differed was the conveyed nonverbal cues. The differences in coding and feelings of trust can therefore both be attributed to the specific nonverbal behaviors, supporting prior evidence that these highly influence interpersonal inferences.

Limitations

Primary aim

The primary aim for this thesis has several limitations that should be mentioned. First, the recruited actors were all female and Caucasian, which do not offer much diversity nor

account for gender effects. Second, the "halo effect" might have impacted the coding process by causing the actor who received the highest ratings of attractiveness to also receive more positive ratings on other items. Third, the coding process was based on subjective assessments, and objective measures would likely have caused the ratings to be more accurate. Different measures of nonverbal behaviors occur on a continuum from the micro to the macro, and therefore involves an increasing degree of inference at the expense of specificity (Blanch-Hartigan et al., 2018). For the aim of coding micro-level behaviors, some might argue that a more objective approach would be fitting. However, Blanch-Hartigan et al. (2018) argue that the chosen approach is of less importance if inter-coder reliability is achieved, which it indeed was for the primary aim. A possible justification of the chosen approach in this case is that it enabled the coders to rely on the same mechanism of general impressions as the participants in the mother project will. Fourth, ratings of cues related to different nonverbal channels were done simultaneously. The positive cues conveyed through one channel could therefore have affected the impressions of cues from other nonverbal channels. The coding process might have benefitted from coding one nonverbal channel at a time. Lastly, the primary results cannot provide conclusive answers as to why the PFE and the PTV both received high ratings of positive tone of voice, in addition to why the PBM was perceived as less positive than the two other enhanced conditions. Further research on the challenges associated with inferring positive emotions from body movements alone might be of interest, and further illuminate this finding.

Secondary aim

Regarding the limitations of the secondary aim, the following points should be considered. First, the same female actor was featured in all videos, and the present findings could partially be a result of her specific characteristics. Additional studies should include more actors, to investigate whether various characteristics will elicit different ratings of trust despite them all conveying the same standardized behaviors. Second, using a convenience sampling strategy meant that the sampling was not random and was carried out by selecting participants that were easily available. This might have resulted in a sample that was not representative. Third, the data collection was largely governed by constraints of time and resources. Fourth, the overall sample size of 50 participants was small, and caution should be paid in generalizing the present findings. The small sample size caused the participants to be thinly spread across the demographic variables. For an example, the mean age was 27.48 (*SD* = 10.89), despite the age ranging from 19 to 61. In addition to this, the sample consisted of relatively more females than males. Fifth, the present study might have benefitted from

including an additional control video containing all neutral nonverbal behaviors. Due to the time constraints, it was however challenging to gather participants for yet another participant group. Sixth, the enhanced nonverbal conditions do not correspond with how people convey nonverbal behaviors in everyday life. Isolated nonverbal behaviors are combined to form impressions of others (Watson et al., 2013), and the channelized nonverbal scenarios may therefore have been perceived as unnatural. Seventh, individual inclinations to trust other people might have impacted the participants' ratings and is something future research should consider. Eight, the videos lasted about three minutes, and it is uncertain whether this is a sufficient length to elicit macro-level impressions of trustworthiness. Ninth, no analysis was conducted to compare the warm and friendly condition with the enhanced conditions. Whether significant differences existed between them were therefore uncertain, and additional studies should further examine this. Lastly, online surveys may be biased by low and selective participation, in addition to dishonest responses and loss of interest during completion (Heiervang & Goodman, 2009). To counter this, we kept the number of questions low (N = 21) and made sure they were all easy to comprehend. Completion would therefore not take long.

Conclusion

For the primary aim of this thesis, the validity and reliability of enhanced nonverbal behaviors were tested. The enhanced conditions were shown to display the behaviors they should, suggesting that the future results of the mother project will reflect the true effects of these behaviors on the experience of pain. Furthermore, the present results demonstrate that it is possible to enhance micro-level nonverbal behaviors, and that these can be validated and systematically manipulated. Validation of nonverbal behaviors introduces an approach to systematically control some of the non-specific factors in treatment settings (e.g., the nonverbal behaviors of health care providers). Therefore, the present findings have important implications for the teaching of clinical communication. Systematic implementation of certain nonverbal cues may increase patient satisfaction and positively affect patients' experience of certain symptoms. Further research is needed to identify the connections between specific nonverbal behaviors and favorable patient outcomes. Interesting findings emerged in relation to overall impressions of positivity and dominance, and further investigations of how micro-level nonverbal behaviors affect such general impressions will also be of interest for the purpose of improving clinical communication.

For the secondary aim of this thesis, the effects of incongruence between nonverbal behaviors on trust were investigated. Results indicate that enhancing a nonverbal channel does not lead to incongruence, and that if it does, this does not affect people's feelings of trust in a health care provider. Enhanced facial expressions seems to have a greater effect on trust compared to the display of positive cues from all nonverbal channels. This indicates that facial expressions are of great importance for the formation of psychosocial concepts such as trustworthiness, and that the present findings may have important clinical implications. Training healthcare students to enhance positive facial expressions in interactions with patients may increase the presence of trust in physician-patient relationships. In turn, this might facilitate beneficial treatment outcomes. Additional research is needed to investigate the present findings more closely due to the small sample size of the study. Important knowledge can be gained by further exploring the effects of enhanced facial expressions and other nonverbal behaviors on the formation of trust and may lead to a greater understanding of what makes us trust others.

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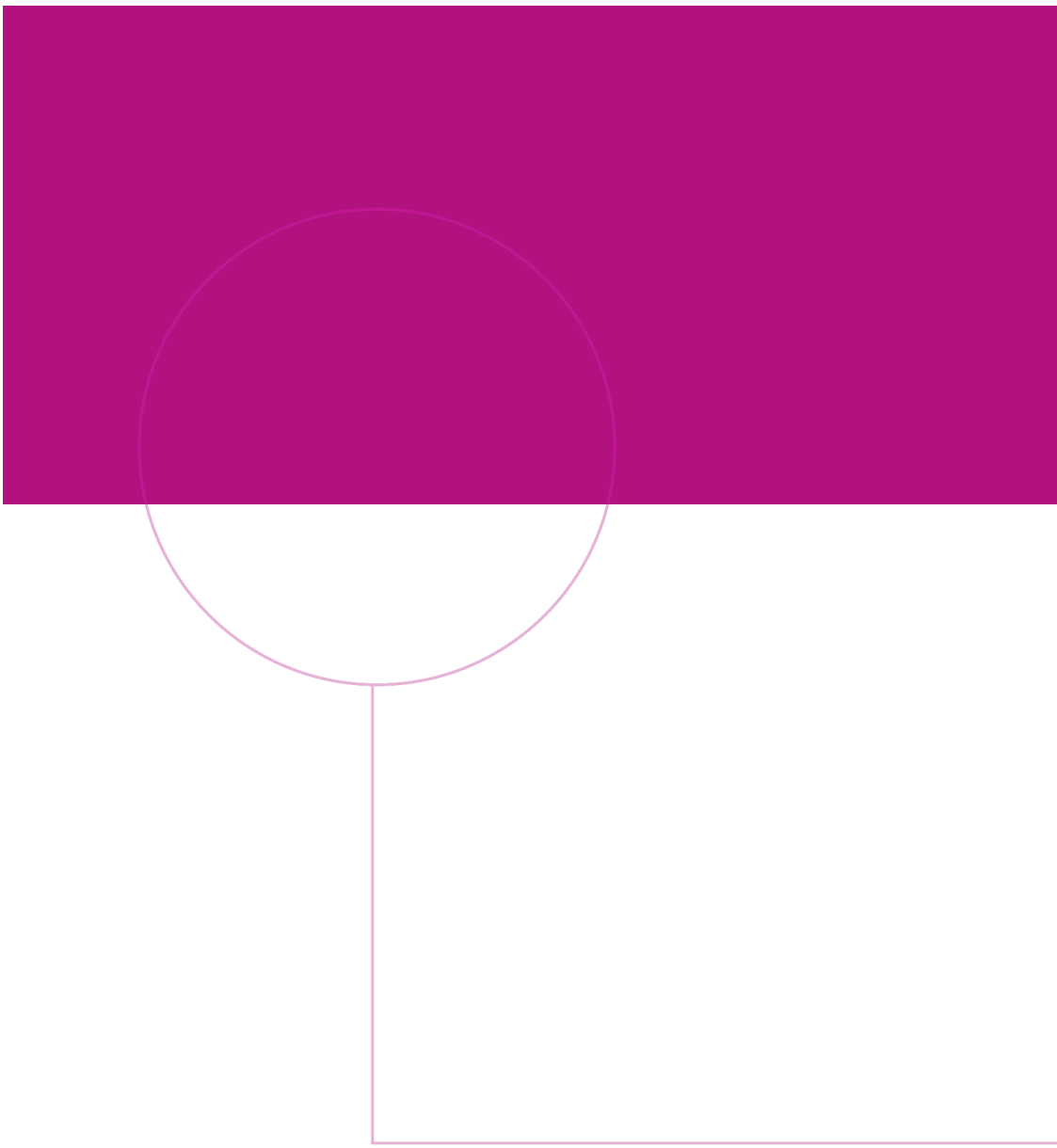

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