

**Specifying micro level non verbal behaviour and exploring the influence of
personality on perception of nonverbal behaviour.**

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Foreword and self-declaration

Videos, coding schema, training for how to use coding schema and continual feedback was provided by my supervisor Hojjat Daniali. Literature was found through NTNUs search engine oria.no or recommended by my supervisor. Gathering participants for the online study was a collaborative effort of several students with special thanks to Kjell Solheim Sluppen who set up the online survey. All other contributions to the thesis are my own.

Abstract

Nonverbal communication has mostly been studied as a holistic phenomenon. This thesis investigates if nonverbal behaviour can be broken down into three channels of micro level nonverbal behaviour, namely facial expressions, body movements and tone of voice. A series of videos were coded and analysed for these three channels of nonverbal behaviour. Results indicate that the channels can indeed be separated with a slight exception for facial expressions overlapping with tone of voice. The effect of these channels on higher level traits of dominance, expressiveness and overall impression of positivity are discussed. Additionally a discussion about personality and nonverbal behaviour is introduced via an exploratory randomised online survey investigating the potential effects of personality on perception of nonverbal behaviour. Participants completed a brief personality inventory, then watched one of four videos with either neutral nonverbal behaviour, positive facial expressions, positive body movement or positive tone of voice. Participants then rated the presenter in the video on positive and negative affect. Analysis of the results indicate marginal support for openness and agreeableness as having a moderating effect. Future directions for research on personality and nonverbal behaviour are discussed.

Introduction

Human communication relies on several channels of information (Blanch-Hartigan, Ruben, Hall & Mast, 2018). The most obvious one being spoken language, but a substantial amount of information is also communicated nonverbally (Mehrabian & Wiener, 1967). Nonverbal behaviour can take the form of facial expressions, body movements, distance between communicators, speed of speech and tone of voice, in short any communicative act that does not carry linguistics (Roter, Frankel, Hall & Sluyter, 2006). The sentence “ you are unbelievable” can be anything from a loving phrase if said with a warm tone and a smile to an insult if exclaimed with an exasperated tone and arms thrown into the air. This type of communication is continuous in any interaction meaning that nonverbal communication is constant and oftentimes unconscious (Chen et al., 2019). In fact it is impossible to not communicate nonverbally as absence of nonverbal communication is in itself communicating something (Blanch-Hartigan et al., 2018).

A wide variety of topics regarding nonverbal communication has been investigated. From patient caregiver interactions (Chen et al., 2019, Daniali & Flaten, 2019, Ibilbor & Moses, 2021, Hillen et al., 2015), parent-child interactions (Novack, et al., 2022), human-robot interactions (Saunderson & Nejat, 2019), teacher-student interactions (Schneider, Krieglstein, Beege & Rey, 2022), partner relationships (Schrage, Maxwell, Impett, Keltner & MacDonald, 2020) and even how different clusters of personality disorders differ in production of nonverbal behaviour (Marono, Clarke, Navarro & Keatley, 2017). In most of these studies nonverbal communication is studied as a holistic phenomenon. However there may be differences in how individual micro level nonverbal behaviour operates in any interaction. Micro level nonverbal behaviour divides nonverbal behaviour into the channels of facial expressions, body movement and tone of voice. Facial expressions include everything that can be communicated through the face such as smiles, eyebrow raises, eye movement and wrinkling the nose. Body movement is composed of gesturing, pointing and any other communicative act with the hands or other limbs. Head movements such as nodding or shaking the head and bodily postures such as leaning forward, slouching or sitting straight up are also part of body movement. Finally, tone of voice includes how the words are spoken, for instance if they have a warm and inviting tone or a harsh and abrasive one. The primary aim of this thesis is to investigate if a series of video recordings of three actors are communicating only one type of positive micro level nonverbal behaviour while keeping other channels neutral. Which of the micro level nonverbal behaviour channels that

are active and which is neutral is varied between videos. Between group differences are analysed based on groupings by actors and by video condition. These videos will then be used in further research to investigate if different channels of micro level nonverbal behaviour affect pain perception in a patient caregiver interaction. Validating these different channels of micro level nonverbal behaviour can also help future research be more specific about exactly how nonverbal behaviour affects interactions.

Measuring, quantifying or coding nonverbal behaviour can have several approaches (Blanch-Hartigan et al., 2018). Coding can be done on a scale between minute detail to overall impressions. Eye contact can be measured as a function of time spent holding eye contact divided by total time of interaction, as a function of how long gaze was held for each duration of eye contact or on an impression scale of how much it felt like the person was holding eye contact during an interaction ranging from “not at all” to “extremely”. Codes can also be done for traits covering multiple micro level nonverbal behaviours such as dominance. Dominance as a trait relies on a combination of posture, tone of voice and facial expressions (Burgoon, Wang, Chen, Pentland & Dunbar, 2021). A key concern in what coding scheme is chosen is the research question and also the available resources. As the current thesis is looking to validate a series of videos in a short amount of time an impressionistic coding scheme was chosen covering a range of traits and behaviours sufficient to satisfy the primary aim. More on this in the method section.

There is also a void in the field on how personality affects the perception of nonverbal behaviour. In fact not much work has been done on the effect of personality in any regard to nonverbal behaviour. This thesis has a secondary aim of introducing a discussion about personality in nonverbal behaviour by conducting an exploratory study examining the effect of each of the five personality dimensions of Extraversion, Agreeableness, Neuroticism, Conscientiousness and Openness as moderators of nonverbal behaviour perception. These five traits have been shown to be stable and replicable in several studies from a wide range of samples (Larsen & Buss, 2018). People high in Extraversion are described as talkative, sociable and adventurous. High Agreeableness is described as good-natured, cooperative and gentle. High Conscientiousness is described as responsible, scrupulous and tidy. High Neuroticism is described as nervous, anxious and excitable. Finally, high Openness is described as intellectual, artistic and imaginative (Goldberg, 1990). A randomised online survey was conducted wherein participants completed a brief personality inventory and then rated videotaped actors as having positive or negative affect.

The relationship under inspection is one where personality moderates how nonverbal behaviours are rated on positive and negative affect. In a moderating relationship the relationship between predictor and outcome variable is changed by the inclusion of a third moderating variable (Field, 2018). For example, the amount of nightmares (outcome) a person has after watching scary movies (predictor) might be moderated by how vivid of an imagination they have (moderator). The relationship between nonverbal behaviour, e.g. seeing someone smile, and judging them as more positive might be moderated by how agreeable the person making the judgement is. Initiating a discussion regarding these potential effects of personality on nonverbal behaviour is the secondary aim of this thesis.

Methods primary aim

Coders

A total of 15 coders (age 21-25, 4 male and 11 female) were recruited from third year students completing their bachelors degree in psychology at the Norwegian University of Science and Technology. Coders received training by an expert in the field and during lectures throughout the semester to use rating scales with appropriate anchors to code videotaped actors on measures mentioned below. The training consisted of watching example videos and talking through what ratings should be for each of the coding items. A consensus was reached for each item before moving to the next. This process was then repeated several times until coders reached a consensus of how each item was to be coded.

Actors and videos

Three professional actors (age 25-30) played the role of video taped experimenters. The actors were all caucasian norwegian females. Actors were trained with two scripts, one for verbal behaviour and one for nonverbal behaviour. The verbal script was identical for all conditions, while the nonverbal script differed according to condition. An expert in the field of nonverbal behaviour was present during training to help guide the process. When recording the videos the actors wore a white lab coat and light makeup to resemble a professional healthcare provider.

The final videos for coding consisted of seven segments titled, "Calibration", "Introduction", "Pretest", "Positive facial expression", "Positive tone of voice", "Positive body movement" and "Neutral". These videos will be used in a larger experiment where participants are introduced to the experiment with the "Introduction" video, some calibrating

measures are then made with the “Calibration” video. The “Pretest video” comes before an intervention and after the intervention either of the “Positive facial expression”, “Positive tone of voice”, “Positive body movement” or “Neutral” videos are played. The verbal information is identical in “Positive facial expression”, “Positive tone of voice”, “Positive body movement” or “Neutral” videos. Nonverbal behaviour is neutral for “Calibration”, “Introduction”, “Pretest” and “Neutral” videos meaning facial expressions are kept blank, tone of voice is neither positive nor negative and body movement is minimal. “Positive facial expression”, “Positive tone of voice” and “Positive body movement” are intended to have micro level nonverbal behaviour corresponding to their names while keeping other channels neutral. “Positive facial expression” aims to have more smiling, eye contact and overall facial activity. “Positive tone of voice” is intended to have a warm and friendly tone of voice and “Positive body movement” is intended to include more gestures, nodding and leaning forwards.

Measures

The main aim of coding the videos was to test the validity of micro level nonverbal behaviour. To do so eight scales consisting of Gestures, Smiling, Eye contact, Friendly/positive tone of voice, Dominant and in charge, Overall impression of positivity, Expressiveness and Attractiveness were rated on a nine point likert scales ranging from 1 = “not at all” to 9 = “extremely”. This coding scheme was developed by Mollie Ruben, assistant professor of psychology at the University of Maine.

Procedures

Videos of the actors were cut down to bins so as to not have to code several hours of video. Such bins have been shown to reliably represent larger samples (Blanch-Hartigan, Ruben, Hall, & Mast, 2018). The short slices of bins were selected from the beginning, middle and the end of the full episodes. Coders then coded 21 bins taken from all three actors across the four different conditions of positive body movement, positive tone of voice, positive facial expressions and neutral nonverbal behaviour.

Statistical Analysis

All statistical analysis was done in SPSS. Inter-rater reliability for the coding was assessed with Cronbach’s Alpha. Two ANOVAs were run to investigate between group

differences. The first ANOVA grouped the codings by actors to check if they had acted similarly across all video conditions. The second ANOVA grouped codings by video to investigate differences and similarities in proposed different micro level nonverbal behaviour.

Data Screening

Raw codings were imported to SPSS from excel and mean variables based on all coders were computed. One coders responses on gestures was removed due to a misunderstanding of the coding scale.

Methods secondary aim

Participants

100 participants (age 15-52, $M = 25$, $SD = 7.00$, 26 male 56 female) were recruited from classmates, friends and families of the coders and asked to complete an online survey. Participants for the online survey were gathered using convenience sampling. Classmates, friends and family members of the coders were given a link through social media or were shown a QR code, a two dimensional barcode readable by smartphones, that both led to the same survey hosted on Nettskjema.no. Nettskjema is a data gathering tool developed by the University of Oslo.

Measures

The online survey used the BFI-10 (Rammstedt & John, 2007) that assesses the five personality dimensions, extroversion, agreeableness, conscientiousness, neuroticism and openness with two items per dimension. Participants read the statement “I am a person that...” followed by for example “... is reserved”. The items were then rated on a five point likert scale ranging from 1 = “Totally disagree” to 5 = “Totally agree”.

The videos being used had the exact same verbal information, but different nonverbal behaviours. The verbal information given was regarding a fictitious pain relieving medication called Embla. The different nonverbal behaviours were “neutral”, “positive facial expression”, “positive body movement” and “positive tone of voice”. As in the primary aim, only one channel of positive nonverbal behaviour was communicated for the “PFE”, “PBM”, and “PTV” videos while the other channels were kept neutral. The “neutral” video had all channels be neutral. These videos were shortened versions of the videos being used in the

primary aim only lasting about one minute each. In the video an actor presents a pain relieving medication aimed at reducing pain from burns. The video also assured the participants that the medication had no known side effects.

After watching the video the participants rated the presenter on the Positive and Negative Affect Schedule (PANAS) (Watson, Clark & Tellegen, 1988) consisting of 10 items asking “How well does the person in the video fit these descriptions?” with a five point likert scale ranging from 1 = “ Very slightly or not at all” to 5 = “Extremely”. Examples of the adjectives used are “Active”, “Hostile” and “Inspired”. Positive and negative affect are not meant to be opposite ends of the same spectrum, but rather independent measures (Rammstedt & John, 2007). A person with high positive affect would be active, energetic and attentive, while a person with low positive affect would be tired, lethargic and sad. High negative affect is described as hostile, angry, nervous or disgusted, while low negative affect would be a state of calmness and peacefulness.

Procedures

Participants in the online survey were told the purpose of the survey was to investigate the effects of expectation on hypothetical pain. After asking about age, gender and a brief personality inventory, the survey presented a hypothetical scenario involving a painful experience after which a pain relieving medication was introduced by a videotaped actor. The hypothetical painful situation involved burning your hand on a stove to the point where it would be red and have some blisters, but not be severely injured. After imagining this painful situation participants watched one of four videos. The survey had four subgroups that were all identical except for the video presenting the pain relieving medication. Participants were randomised into one of four subgroups through nettksjema.no so that the first participant would watch the “neutral” video, the second would watch the “PFE” video, the third would watch the “PBM” video and the fourth would watch the “PTV” video and the fifth would loop around to the “neutral” video again and so on for all 100 participants. Participants were then asked to rate the expected efficacy of the medication as well as some qualities of the videotaped presenter. Results from the survey were used by multiple students writing their bachelor and so included a total of 12 items of which only five are being used in this essay.

Statistical analysis

Moderated linear regression was done using SPSS with PROCESS v4.0 by Andrew F. Hayes. Assumptions of normality, homoscedastic and linearity were checked for running

linear regression. Positive Affect (PA) and Negative Affect (NA) were the dependent variable in separate regression models, nonverbal behaviour (video type) was the independent variable and one personality trait was the moderating variable. The PROCESS macro can only include one moderating variable at a time, and so five linear regressions were run, one for each personality trait.

Data screening

20 responses were excluded based on time limits, spending more than one hour on the survey, or getting a control question wrong. This left 80 participants for the analysis.

Results primary aim

Inter rater reliability for Gestures, Smiling, Eye contact, Friendly/ positive tone of voice, Overall impression of positivity, Expressiveness and Attractiveness were all, $\alpha > .90$. Inter rater reliability for Dominant and in charge was, $\alpha = .83$

A one way ANOVA showed no significant differences between actors based on Gestures, Smiling, Eye contact, Friendly/ positive tone of voice, Dominant and in charge, overall impression of positivity and expressiveness. There was a significant difference based on attractiveness between all actors, $F(2, 21) = 3746.23, p < .001$. The biggest difference, $\Delta M = 2.29, p < .001$, was between actor "1", $M = 5.78, SD = 0.05$, and actor "3", $M = 3.50, SD = 0.08$. The second biggest difference $\Delta M = 1.37, p < .001$, was between actor "2", $M = 4.87, SD = 0$, and actor "3" $M = 3.50, SD = 0.08$; suggesting that actor "1" was rated as the most attractive.

Another one way ANOVA showed significant differences in videos based on Gestures, $F(6, 20) = 206.09, p < 0.001$, Smiling, $F(6, 20) = 15.95, p < 0.001$, Eye contact, $F(6, 20) = 21.60, p < 0.001$, Friendly/ positive tone of voice, $F(6, 20) = 28.16, p < 0.001$, Dominant and in charge, $F(6, 20) = 6.48, p = 0.002$, Overall impression of positivity, $F(6, 20) = 14.22, p < 0.001$, and Expressiveness, $F(6, 20) = 28.34, p < 0.001$.

A Tukey post hoc test was used in all cases except for gesture and expressiveness where a Games-Howel post hoc was used because both gesture and expressiveness had significant results on a homogeneity of variance test, $p < .05$.

PBM videos had more gestures, ΔM between 5.18 and 5.51, $p < .017$, than all other videos. PBM videos were also rated as more dominant and in charge, ΔM between 0.84 and 0.96, $p < .04$, than calibration, neutral and pretest videos, all exhibiting neutral nonverbal

behaviour. Finally PBM videos had a higher overall impression of positivity, $\Delta M = 1.64$, $p = .03$, than videos titled neutral.

The mean difference for expressiveness was approaching significance, ΔM between 2.49 and 3.00, $p < .08$, between PBM videos and all neutral nonverbal behaviour videos.

PFE videos had more smiles, ΔM between 3.93 and 4.81, $p < .001$, than all other videos and more eye contact, ΔM between 3.53 and 5.42, $p < .001$ for all videos. Friendly/positive tone of voice, ΔM between 1.42 and 2.16, $p < .02$, and overall impression of positivity, ΔM between 1.53 and 3.18, $p < .05$, was also rated higher for PFE videos than all other videos except PTV videos. PFE videos were also more expressive, ΔM between 1.91 and 2.29, $p < .01$, and dominante, ΔM between 0.89 and 1.00, $p < .03$, than calibration, introduction and pretest videos, all exhibiting neutral nonverbal behaviour.

PTV videos were rated higher on friendly / positive tone of voice, ΔM between 1.76 and 3.91, $p < .01$, than all other videos. PTV videos were also rated as higher on overall impression of positivity, ΔM between 1.67 and 2.36, $p < .03$, than all videos with neutral NB.

No significant differences were found between any of the neutral videos.

Results secondary aim

The proposed model of interaction is that personality will moderate how nonverbal behaviour is perceived and judged. For instance, a person low in extraversion might perceive someone leaning forward as quite dominating, while someone high in extraversion might perceive it as not so dominating. The analysis checks for any of these interactions across the five traits of extraversion, conscientiousness, neuroticism, agreeableness and openness.

Assumptions of normality, homoscedastic and linearity were met for PA, however NA was not normally distributed as both a Kolmogorov-Smirnov and a Shapiro-Wilk test were significant, $p < .001$. Because of this and the nonverbal behaviour in the videos being positive linear regression was not run for NA.

Five moderated linear regressions, all with PA as the dependent variable, nonverbal behaviour (video type) as the independent variable and one personality trait as the moderating variable were run.

Extraversion

With extraversion as the moderator the model was insignificant, $R^2 = .13$, $F(72) = 1.56$ $p = .16$.

Conscientiousness

With Conscientiousness as the moderator the model was insignificant $R^2 = .16$, $F(72) = 1.99$ $p = .07$.

Neuroticism

With neuroticism as the moderator the model was insignificant $R^2 = .11$, $F(72) = 1.26$ $p = .28$.

Agreeableness

With agreeableness as the moderator the model was significant $R^2 = .18$, $F(72) = 2.30$ $p = .04$. However no predictors were significant. Table 1 shows all predictors in the model.

Table 1

Moderated linear regression for PANAS PA with Agreeableness as moderator ($N = 80$)

Variabel	<i>b</i>	SE <i>b</i>	R^2
Model			.18*
Positive facial expression (PFE)	2.20	1.12	
Positive body movement (PBM)	0.37	1.07	
Positive tone of voice (PTV)	-1.08	1.23	
Agreeableness (A)	0.27	0.23	

A x PFE	-0.47	0.32
A x PBM	-0.02	0.31
A x PTV	0.35	0.34

* $p < .05$

Note: "Neutral" videos were used as a comparison for creating dummy variables and are therefore not included in the table

Openness

With openness as the moderator the model was significant $R^2 = .20$, $F(72) = 2.59$ $p = .02$. However no predictors were significant. Table 2 shows all predictors in the model.

Table 2

Moderated linear regression for PANAS PA with Openness as moderator ($N = 80$)

Variabel	b	SE b	R^2
Model			.18*
Positive facial expression (PFE)	0.34	0.98	
Positive body movement (PBM)	-1.42	1.02	
Positive tone of voice (PTV)	1.59	0.91	
Openness (O)	-0.13	0.16	

O x PFE	0.07	0.26
O x PBM	0.43	0.27
O x PTV	-0.45	0.25

* $p < .05$

Note: "Neutral" videos were used as a comparison for creating dummy variables and are therefore not included in the table

Discussion primary aim

The main findings from the primary aim indicate that there are differences in the videos based on micro level nonverbal behaviour and most importantly the micro level nonverbal behaviour mostly do not cross into different channels than they are meant to. Additionally, videos with one channel of positive micro level nonverbal behaviour were mostly rated as more dominant, expressive and overall positive than videos with all neutral micro level NB.

Four of the coding items were specific to one channel of micro level nonverbal behaviour. Smile and eye contact load onto facial expressions, gesturing loads onto body movements and friendly/ positive tone of voice loads onto tone of voice. PFE videos were perceived as having a more friendly/ positive tone of voice than all videos except PTV videos. Other than this, none of the micro level nonverbal behaviour spilled over into other channels. The other three coding items, dominance, expressiveness and overall impression of positivity, are compound or higher level traits that do not clearly load onto any one channel of micro level nonverbal behaviour. As such it would be expected that any of the PFE, PBM and PTV conditions would be significantly higher on these than all of the neutral nonverbal behaviour conditions. This was mostly the case. PBM videos were rated as more dominant, but only as more overall positive than one of the neutral nonverbal behaviour videos. The mean difference for expressiveness between PBM videos and neutral videos was large but not quite significant. PTV videos were more overall positive but not more dominant or expressive. PFE videos were more dominant, expressive and overall positive. Several conclusions can be drawn from these results. 1) Different channels of micro level nonverbal

behaviour, with the exception of PFE and PTV, are separable. 2) individual micro level nonverbal behaviour may not be strong enough to induce changes in all of the compound/ higher level traits and conversely compound trait perceptions may not rely on all channels of micro level NB. 3) The channel of PFE seems to be the most impactful.

With the exception of PFE videos being perceived as having a more friendly/ positive tone of voice than all videos except PTV videos, none of the micro level nonverbal behaviour spilled into each other. Tarter (1980) showed that humans can distinguish speech produced while smiling and speech produced without a smile. While smiling the mouth changes shape and this affects how words are pronounced leading to slight differences in tone of voice. This helps explain why PFE videos were perceived as having a more friendly/ positive tone of voice. However this also casts doubt on whether or not it is possible to completely separate the channels of facial expressions and tone of voice in micro level NB. In everyday communication distinct channels of nonverbal behaviours are rarely communicated in complete isolation (Paulmann & Pell, 2011). Facial expression, tone of voice and body movements are all active during regular conversation. This overlap between facial expressions and tone of voice is not only limited to smiling interactions. Visual and auditory multi-modal perception of emotion has been shown to influence each other (Collignon, et al., 2008). However, the fact that these channels of perception influence each other does not mean they are inseparable, but rather that they share a relationship. This relationship seems to be stronger for facial expressions affecting tone of voice perception than tone of voice affecting facial expression perception (Collignon, et al., 2008). Completely separating the perception of these channels of nonverbal behaviour at the receiving end of communication might not be possible, nonetheless the results indicate that the channel of body movement is completely separable. Facial expressions and tone of voice may require other coding schemes to be separated or might not be completely separable.

One channel of positive micro level nonverbal behaviour is seemingly not enough to always induce changes in compound traits. But is this to be expected? Should a positive tone of voice be perceived as more dominant? The fact that PTV videos were not perceived as more dominant does not indicate that the perception of dominance does not at all rely on tone of voice, but rather that a specifically positive tone of voice is not perceived as dominant. A stern and commanding tone of voice will likely be perceived as more dominant than a neutral tone of voice.

The trait of expressiveness was higher for all videos with a channel of micro level nonverbal behaviour set to positive than videos with all channels neutral. This could mean

that any form of nonverbal behaviour that is not neutral is perceived as more expressive, or it could be that all the videos with neutral nonverbal behaviour were exceptionally un-expressive. It could also hint at a problem with how neutral nonverbal behaviours are perceived as cold due to a lack of positive communication, more on that in the limitations section.

PBM videos were only higher than one of the neutral videos on overall level of positivity, while PTV videos were higher than all neutral videos and PFE videos were higher than all neutral videos and PBM videos. This indicates that the channel of PBM is not the best for communicating positivity. It could also be that the situation does not favour PBM. A stationary seated medical professional giving information might not give an opportunity for PBM to impact overall perception of positivity in the same way as in a situation where the communicator is free to move around. It seems then, that micro level nonverbal behaviour can induce changes in higher order trait perceptions, but only if the micro level nonverbal behaviour is geared towards this trait specifically. What mix of micro level nonverbal behaviours that are most appropriate for clinical interactions remains to be seen and will require further research.

Simultaneously as micro level nonverbal behaviour could influence any higher order trait, it is not the case that all channels of micro level nonverbal behaviours are needed to influence such traits. From the results of the current thesis it seems that dominance can be communicated by facial expressions or body movement and that only one of these channels need be active to induce changes in perceived dominance. Expressiveness and overall impression of positivity also seem to be influenced, at least to a certain extent, by PFE, PTV and PBM. These higher level traits are not influenced equally by all channels of micro level nonverbal behaviour, but this may be due to exactly what traits are being measured and the nature of the micro level nonverbal behaviour being communicated as seen with dominance and PTV. The number of higher order traits possibly affected by micro level nonverbal behaviour is vast and determining which channel is most effective at inducing changes in them will require future research.

PFE videos were more impactful than PTV videos and PBM videos by being significantly higher compared to more neutral nonverbal behaviour videos on more traits. It could be that the way the situation is set up favours facial expressions. The actors are seated for the entire video and so are limited in their range of motion and their faces are framed centrally throughout the video. However, research on multimodal auditory and visual perception of emotion has indicated human perception is visually dominated (Collignon, et

al., 2008). In addition six basic human emotions of fear, anger, surprise, joy, disgust and sadness communicated through facial expressions have been found across cultures suggesting they are universal in how they are produced and perceived (Ekman, 1992). Visual processing and special attention to the face is no surprise then and could indicate that training for medical professionals should pay special attention to nonverbal communication through facial expressions.

Limitations primary aim

Two critiques that can easily be levelled at the current thesis regard the coding scheme and the ecological validity of the design.

The coding scheme lacks a way to determine if gestures are positive or negative and a measure for how natural the interaction felt. A person giving the middle finger and a person nodding along in a conversation are both gesturing through body movement, but are communicating different things. A more nuanced coding scheme for each of the channels of micro level nonverbal behaviour could uncover exactly what type of facial expression, body movement and tone of voice lead to which compound traits. To what degree such descriptions are made in the coding is a decision based on the research question. As the current primary aim was to validate different channels of micro level nonverbal behaviour, a more descriptive coding scheme for body movements may have elevated the study, but would not have been essential in determining if the channels are distinct. However, adding a measure of ecological validity would have elevated the research and addressed a different category of concerns, namely how human the interaction feels. Ecological validity addresses how natural or realistic a situation is and is often a concern in laboratory settings (Meltzoff & Cooper, 2018). Hearing a warm and friendly tone of voice, but seeing a blank face and a person sitting more or less completely still can be jarring. The suggestion here is not to only complete studies that feel completely natural, but rather to include some measure of ecological validity so that results can be interpreted with the right amount of caution. This leads to the second limitation on how representative the videos are for real life scenarios.

The videos simulate a patient-caregiver interaction from real life. In any such interaction more than one channel of micro level nonverbal behaviour would be active. Humans constantly send signals through all these channels and not receiving any is in and of itself a signal (Blanch-Hartigan et al., 2018). Making judgements and inferences about others' emotional and mental states based on overt signals is a fundamental component to human interaction and so humans are automatically taking in as much information as possible

(Paulmann & Pell, 2011). Collignon, et al. (2008) show that these channels constantly interact and so having one be “off” is not necessarily the same as having it be neutral and is also not something that happens regularly in every day interactions. Seeing a medical professional keep a carefully blank expression on their face might even be interpreted as a sign that everything's not alright. Not having a measure of how natural the interaction feels is thus a limitation of the thesis.

Discussion and limitations secondary aim

No significant evidence for extraversion, neuroticism or conscientiousness as having a moderating effect on perception of nonverbal behaviour was found. Openness and agreeableness had significant overall linear regression models, but no factors were individually significant. Having an overall significant linear regression model but no significant factors can be caused by an issue of collinearity between the factors meaning that the regression can not tell which of the factors are causing the change in the outcome variable. However the VIF score was between 1 and 2 for all analysis indicating that collinearity was not a problem. It may just be then that the sample is not large enough to give sufficient statistical power to disentangle factors. Two conclusions can be drawn from these results 1) Personality is not involved in moderating perception of nonverbal behaviours. 2) The micro level nonverbal behaviours used in the study and the length of the video clips shown was not enough to induce changes on the measures used.

Personality could simply not have a moderating effect on how nonverbal behaviours are perceived. The relationship might be mediational in nature or there might be no relationship at all. However, it seems unlikely that personality plays no role at all given how pervasive it is in all aspects of human life (Larsen & Buss, 2018). The measures used in this study were brief, but have all been validated (Rammstedt & John, 2007; Watson, Clark & Tellegen, 1988). The videos used however were around one minute long and included only one channel of micro level NB. The sample size was also not enormous; N = 80, only gave 20 participants per condition. Paulmann, S., & Pell, M. D. (2011) showed that recognizing emotions in others is more accurate when presented with both visual and auditory stimulus. It may be then that the manipulations used in the study were not strong enough to reveal any relationship between personality and perception of nonverbal behaviour. Further research using either longer videos / interactions or macro level nonverbal behaviour or both will certainly be interesting and potentially helpful in uncovering any effect of personality on nonverbal behaviour.

Conclusion

With the exception of facial expressions spilling over into tone of voice, the channels of facial expression, tone of voice and body movements are separable in the current sample. Higher level traits can be activated by any one of these channels if the content communicated is geared towards the higher level trait. Facial expressions influence communication more than other channels. Future research could investigate what composition of micro level nonverbal behaviour is most beneficial in situations ranging from clinical to interviews and also how these channels of micro level nonverbal behaviour interact.

Personality does not seem to have a moderating effect on perception of nonverbal behaviour in the current sample. However, future research using macro level nonverbal behaviour may find different results.

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