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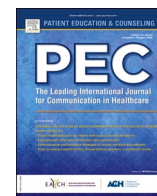
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# Effects of reasoned treatment decision-making on parent-related outcomes: Results from a video-vignette experiment in neonatal care

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## ABSTRACT

**Objective:** To examine the effects of clinicians' provision of (un)reasonable arguments on parent-related outcomes in neonatal (intensive) care (NICU), starting from the NICU Communication Framework.

**Methods:** A video-vignette experiment, in which we systematically varied clinicians' use of (*reasonable, unreasonable, no*) argumentation across two non-acute and two acute decision-making scenarios (3×4 design). Reasonable arguments were medically appropriate and constructive reasons to support the treatment plan, as defined by an expert panel. Based on argumentation theory, unreasonable arguments included hindering appeals to authority or the self-evident nature of the treatment plan. Parents of preterm infants completed an online survey, viewing 1 of 12 video-vignettes and answering questions pertaining to their *communication stress, understanding, agreement, participation* in communication, *empowerment, trust* and *satisfaction* with communication. **Results:** N = 163 parents completed the full survey. We found statistically significant ( $p < 0.001$ ) and large ( $\eta^2: 0.13\text{--}0.38$ ) effects of clinicians' use of argumentation across all parent-related outcomes. *Reasonable* argumentation led to lower *communication stress* and higher *understanding, agreement, participation* in communication, *empowerment, trust*, and *satisfaction* with communication than *no* argumentation. In turn, *no argumentation* led to improved outcomes compared to *unreasonable* argumentation. This pattern was similar across non-acute and acute scenarios.

**Conclusion:** Clinicians' use of *reasonable* argumentation has a consistently strong and positive impact on parent-related outcomes in neonatal care.

**Practice implications:** We argue that *reasoned decision-making* should be considered a good clinical practice, core to patient-centered communication. Our findings provide a starting point for (1) determining good argumentative practices and (2) designing evidence-based clinical argumentation trainings.

## 1. Introduction

In conversations about treatment, clinicians can use *arguments* to support the different options that are available. That is, they can provide reasons to explain why a certain treatment option is – medically and

personally – appropriate for this particular patient and in this specific situation [1]. When multiple relevant treatment options are available, clinicians may provide arguments to weigh the pros and cons of these different options and, thereby, engage patients in a process of *shared decision-making* [2–8]. When there is only one relevant treatment option

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(also referred to as *effective decision-making* [9,10]), clinicians may provide arguments to advocate their medical point-of-view; to involve patients and their loved ones in the decision-making process; to obtain informed consent; and to allow them to voice potential concerns. Thus, regardless of the decision context, there is a legal and moral imperative for clinicians to support their treatment recommendations with arguments [6]. We will refer to this approach as *reasoned decision-making*.

To date, studies focused on the characteristics and effects of argumentation across medical settings have demonstrated that clinicians indeed provide arguments to support their medical recommendations [11–13]. Research shows that both clinicians and patients use argumentation to support their views, but that most argumentative exchanges are doctor-led and that patients and their families rarely disagree with their clinicians openly [11–14]. Instead, they express their doubts and concerns implicitly [13–15]. Clinicians may use different types of arguments, focused on aspects of the proposed treatment, patient and family characteristics and preferences, or professional authority [11–14,16–18]. *Symptomatic* arguments, pointing out medical facts concerning the treatment decision, and *causal* arguments, describing consequences of (not) adhering to the treatment decision, seem to be most common [11–14]. Further, clinicians who use argumentation appear to have lengthier consultations, yet are simultaneously perceived to have a more participatory decision-making style and to be more trustworthy, caring, and credible [19]. In addition, clinicians' provision of argumentation seems to increase patients' agreement with, and adherence to, treatment recommendations [20]. Here, a distinction is made between *reasonable* and *unreasonable* arguments [4,6,16,21]. Using the definitions provided by the pragma-dialectical theory of argumentation, *reasonable* arguments constructively support a point-of-view, while addressing – and leaving room for – potential doubt or opposition from another person [22–25].<sup>2</sup> *Unreasonable* argumentative tactics, however, are merely intended to sway the other person (e.g., authority arguments, declaring something self-evident or logical, appeals to emotions, threat-based arguments) [22–25]. Several studies show that clinicians use unreasonable arguments in practice [13,16,26,27]. While *reasonable* arguments are inherently patient-centered, *unreasonable* arguments may hamper patient-reported experiences [6].

In our previous work in neonatal (intensive) care (NICU; the complex medical care provided to infants born preterm, dysmature, or ill [28]), we found that parents of preterm infants indeed expect clinicians to provide argumentation to support their treatment decisions [29], either *prior* to implementing treatment (non-acute decision-making scenarios) or *after* treatment (acute scenarios). Furthermore, we uncovered that there is high consensus among clinicians and parents of what constitutes *reasonable* argumentation for various clinical scenarios in this particular context; that *unreasonable* argumentation is indeed recognized as such; and that *unreasonable arguments* are commonly used by neonatal care clinicians in conversations about treatment [26]. Finally, we found that four functions of communication can be distinguished in neonatal (intensive) care: 1. building/maintaining relationships (between parents and clinicians), 2. exchanging information (about the infant's care), 3. Sharing decision-making (about the infant's treatment), and 4. enabling parent self-management (to foster parents' ability to independently care for their infant during and beyond infant hospitalization) [30]. We found that parents' communication experiences across these functions – including clinicians' use of argumentation to support treatment plans – can affect parents' long-term coping, knowledge, participation,

parenting, and satisfaction [31]. We bundled these findings pertaining to parent-clinician communication in the NICU Communication Framework [29–31].

While these results are compelling, to date, there is no *causal* evidence that proves that clinicians' use of (un)reasonable argumentation impacts parent-related outcomes in neonatal care. Therefore, in the present study, we sought to test the impact of clinicians' use of argumentation on parents, in both *non-acute* and *acute* decision-making settings, using a video-vignette experiment. We hypothesized that clinicians' use of *reasonable* argumentation in support of treatment decisions would have positive effects on all outcomes specified in the NICU Communication Framework, compared to the use of *unreasonable* argumentation and *no* argumentation.

## 2. Methods

### 2.1. Research team

Our multidisciplinary research team included health communication researchers, argumentation scholars, pediatricians-neonatologists (in training) with expertise in family integrated care, trained epidemiologists, and parent representatives. The leading Dutch organization for (parents of) preterm infants, Care4Neo, was actively involved in the research design, participant recruitment, data analysis and write-up of the study.

### 2.2. Ethical considerations

The protocol for this study was registered with the International Clinical Trials Registry Platform (NL-OMON27846) and complies with the ethical guidelines of the Vrije Universiteit Amsterdam (VCWE-2019–132). The study was exempt from medical ethical approval (METC Amsterdam UMC, 2019.596). Findings are reported in line with the GROVE checklist for reporting video-vignette experiments (see Appendix A).

### 2.3. Design

To systematically investigate the effects of clinicians' (un)reasonable argumentation on parent-related outcomes, without directly affecting or potentially harming clinicians or parents in real-life practice, we conducted a video-vignette experiment. Video-vignettes are scripted, hypothetical scenarios of (medical) interactions, which allow for the systematic manipulation of (non-)verbal behaviors in experimental settings [32–34]. Video-vignette experiments are often used in health communication research when communicative behaviors cannot be manipulated in actual practice, for ethical and practical reasons [20, 35–41]. We asked parents of preterm infants to view and evaluate a video-vignette, imagining themselves to take part in the conversation as a parent (as so-called *analogue parents*) [42–45]. Previous studies have demonstrated the validity of this method, showing that video-vignettes ensure high levels of experimental control (*internal validity*), while simultaneously allowing participants to engage and identify with the scenarios displayed (*ecological validity*) – provided that attention is paid to video realism [26,32,33,44]. We previously reported on the development process of our video-vignettes, including clinical observations and expert consultation rounds (see [26]).

### 2.4. Participants

We recruited parents of preterm infants for participation in our experiment through the (social) media channels of Dutch parent/patient organizations (Care4Neo, Strong Babies). Parents were eligible for participation if they met the following criteria: (1) minimally 18 years of age; (2) Dutch speaker, living in the Netherlands; (3) parent to a preterm infant (<37 weeks' gestation), born 1–5 years prior; and (4) a minimum

<sup>2</sup> In the pragma-dialectical theory of argumentation, 'argumentation' refers to a process (providing reasons or arguments) as well as a product (a collection of viewpoints and arguments), used to constructively resolve a (potential) difference of opinion. While in English, 'argumentation' may refer to acts of 'bickering' or 'fighting', in other (European) languages, the term is void of any negative connotation. Argumentation scholars have adopted this neutral-constructive definition of argumentation [22–25].

NICU experience of 1 week (level 2–4, [28]). We excluded parents whose infants had died and parents experiencing anxiety or depression due to their infants' preterm birth.

## 2.5. Procedures

We invited parents between Summer 2022 and Spring 2023 and informed them that participation was anonymous and would take approximately 25 minutes. We did not offer an incentive for participation. We debriefed participants upon completing the survey.

## 2.6. Materials

### 2.6.1. Experimental video-vignettes

We randomly allocated participants to view 1 of 12 experimental video-vignettes, in a  $3 \times 4$  factorial design (see Table 1). Video-vignettes displayed part of an enacted conversation about treatment between a pediatrician-neonatologist, a neonatal nurse, and a parent couple in a neonatal care ward. Four clinical scenarios served as the medical backdrop for the study, including two non-acute (*respiratory support*; *nutritional intake*) and two acute (*blood transfusion*; *lumbar puncture*) decision-making scenarios, to account for potential differences due to decision acuteness. All scenarios concerned common *effective decisions* in neonatal care. For each medical scenario, we created three different vignettes, in which the pediatrician-neonatologist either provided: (1) *reasonable* argumentation, (2) *unreasonable* argumentation, or (3) *no* argumentation to support the treatment plan. For the non-acute decision-making scenarios, the pediatrician-neonatologist provided arguments *prior* to implementing treatment, for the acute scenarios *afterwards*.

The development of the script manipulations has been extensively reported elsewhere [26]. To distinguish between *reasonable* and *unreasonable* arguments in support of each decision, we used the pragma-dialectical theory of argumentation [22–25]. In three expert opinion rounds, we used listing and ranking exercises to identify both adequate and likely reasonable arguments and plausible unreasonable arguments for each decision-making scenario. We selected two arguments for each treatment decision [26]. All reasonable video-vignettes contained one *symptomatic* argument and one *causal* argument. All *unreasonable* video-vignettes contained one argument referring to the pediatrician-neonatologist's own expertise/authority (cf. pragma-dialectics: *ad verecundiam* or *personally vouching for the decision*) and one argument referring to the self-evident nature of the treatment plan (cf. pragma-dialectics: *ad populum* or *presenting the plan as indisputable*) [22–25]. For the scripts, see Table 2.

The video-vignettes were filmed with a professional crew and actors (see Appendix B). We used a multi-camera set-up, in which the viewer sees the video-vignette from an outsider perspective (rather than, e.g., through the eyes of the parents), to allow participants to identify with the parents in the video [32,33]. Actors were strictly instructed to keep non-verbal behaviors and intonation constant across experimental conditions – displaying a neutral tone of voice for both *reasonable* and *unreasonable* arguments [26]. Video-vignettes lasted 1 minute and 22.5 seconds on average (range: 1.18–1.31), including an introduction (50 seconds) with a voice-over, asking participants to identify with the parents in the displayed scenario. We opted for short video fragments, rather than portraying full-length consultations, to maintain optimal experimental control.<sup>3</sup> More so, research shows that thin-sliced materials displaying behaviors can adequately predict outcome variables, in comparison to displays of entire interactions [46].

### 2.6.2. Survey

The video-vignettes were embedded in an online survey (Qualtrics),

including a mobile-friendly version. Prior to viewing a video, participants completed socio-demographic questions concerning their birth year, marital status, educational level, occupational status, and monthly family net income. We also measured participants' health literacy levels, using the three screening questions (5-point scale, ranging from never to always) by Chew, Bradley and Boyko [47]. In addition, we asked participants about their parent role, number of (preterm) children, their birth years, and gestational ages at birth. With regard to their most recent preterm birth, we asked parents to report the duration of their infants' hospitalization and intensive care experiences (level 3–4, [28]).

Starting from the NICU Communication Framework [29–31], our main variables of interest included: parental (1) **coping**, reversely operationalized as *communication stress*; (2) **knowledge**, focusing on parents' *understanding* of, and *agreement* with, the treatment decision; (3) **participation**, specifically in communication and decision-making; (4) **parenting**, operationalized as parents' *empowerment*; and (5) **satisfaction**, including clinician *trust* and *satisfaction* with communication. To measure these outcomes, we used existing, validated scales. When there was no measurement instrument available, we developed new items.

**2.6.2.1. Coping.** We included the 11-item Staff Behavior and Communication subscale of the Dutch Parental Stressor Scale (PSS:NICU) to measure the extent to which parents perceived the clinicians' communicative behaviors in the video as stressful [48–51]. We measured items on a 5-point Likert, ranging from completely disagree to completely agree. The Dutch subscale previously showed acceptable internal consistency with a Cronbach's alpha of  $> .70$ . We computed a total score by averaging all item scores.

**2.6.2.2. Knowledge.** Following the NICU Communication Framework, we operationalized knowledge as parents' recall (results not reported here) and understanding of, and agreement with, the treatment plan. We measured parents' understanding of the treatment plan, using a single item: 'I understand the doctor's treatment plan' (7-point Likert scale, completely disagree to completely agree). To assess participants' level of agreement with the proposed treatment plan, we included a 3-item scale, previously used by Labrie & Schulz [20]. This 7-point Likert scale previously showed excellent internal consistency (Cronbach's alpha: .96).

**2.6.2.3. Participation.** We developed a new scale to assess participants' perceived participation in the conversation. The 8-item scale (5-point Likert, completely disagree to completely agree), included items on, e.g., information-provision, perceived participation in the decision-making process and final decision, and the doctor's openness to opposing viewpoints. We obtained a total score by averaging scores across items.

**2.6.2.4. Parenting.** We also developed a scale to measure parental empowerment. The scale included 8 dichotomous items (7-point scale), assessing how participants would feel concerning the care for their infant, following the displayed conversation, e.g.: skilled-not skilled, confident-not confident, a good parent-not a good parent, in control-not in control. We calculated a total score by averaging all items.

**2.6.2.5. Satisfaction.** To assess satisfaction, we measured participants' trust in the doctor as well as satisfaction with the interaction. We adapted the 5-item Trust in Oncologist Scale Short Form (TiOS-sf, 5-point Likert scale, completely disagree to completely agree). This scale previously showed excellent internal consistency with a Cronbach's alpha of .94 [52]. Finally, we added a single item scale assessing participants' overall satisfaction with the doctor's communication in the video.

To determine whether our experimental manipulations were successful, we included single-item manipulation checks: 'The doctor

<sup>3</sup> Videos (in Dutch) are available upon request.

**Table 1**  
Experimental conditions.

|                       | Clinical scenario                                                 |                                                                   |                                                                   |                                                                      |
|-----------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------|
|                       | Non-acute treatment decision                                      |                                                                   | Acute treatment decision                                          |                                                                      |
|                       | Respiratory support                                               | Nutritional intake                                                | Blood transfusion                                                 | Lumbar puncture                                                      |
| <b>Argumentation:</b> | (1) <i>No</i><br>(2) <i>Reasonable</i><br>(3) <i>Unreasonable</i> | (4) <i>No</i><br>(5) <i>Reasonable</i><br>(6) <i>Unreasonable</i> | (7) <i>No</i><br>(8) <i>Reasonable</i><br>(9) <i>Unreasonable</i> | (10) <i>No</i><br>(11) <i>Reasonable</i><br>(12) <i>Unreasonable</i> |

Note. See [26] for the development of the experimental conditions

**Table 2**  
Video-vignette scripts.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Introduction – Voiceover</b><br>Imagine the following scenario: You recently had a child. Your child was born much too early. Directly following birth, your child was admitted to the neonatal care unit. Here, your child receives respiratory support and tube feeding. Your child regularly receives medication. And sometimes medical complications occur.<br>On a daily basis, you talk to the medical doctors and nursing staff about your child’s medical treatment. You are going to view a <u>short fragment</u> of such a conversation. In this part of the conversation, the doctor explains the treatment plan. The nurse is also present.<br>Try to imagine to be the parent in the video. |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Respiratory support</b>                                                                                                                                                                                                                           | <b>Nutritional intake</b>                                                                                                                                                                                                                  | <b>Blood transfusion</b>                                                                                                                                                                                                                           | <b>Lumbar puncture</b>                                                                                                                                                                                                                           |
| <b>Pediatrician-neonatologist:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | We should also talk about respiratory support. I would propose to decrease the level of respiratory support from CPAP to high flow.                                                                                                                  | We should also talk about nutrition. I would propose to increase the amount of nutrition from 20 to 23 ml per feeding.                                                                                                                     | We should also talk about the blood transfusion. We just had to acutely give extra blood.                                                                                                                                                          | We should also talk about the lumbar puncture. We just had to acutely perform a lumbar puncture.                                                                                                                                                 |
| <b>Nurse:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | [Agreeing:] Yes, right. That is a form a respiratory support that provides less pressure.                                                                                                                                                            | [Agreeing:] Yes, exactly. With his weight there will still be 12 feedings a day.                                                                                                                                                           | [Agreeing:] Yes, precisely. That is called a blood transfusion.                                                                                                                                                                                    | [Agreeing:] Yes, that is correct. That is a puncture to draw spinal fluids for analysis.                                                                                                                                                         |
| <b>Father:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [Worried:] Hmm, ok...?                                                                                                                                                                                                                               | [Worried:] Hmm, ok...?                                                                                                                                                                                                                     | [Worried:] Hmm, ok...?                                                                                                                                                                                                                             | [Worried:] Hmm, ok...?                                                                                                                                                                                                                           |
| <b>Mother:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [In doubt:] Oh is that really wise?                                                                                                                                                                                                                  | [In doubt:] Oh is that really a good idea?                                                                                                                                                                                                 | [In doubt:] Oh was that really sensible?                                                                                                                                                                                                           | [In doubt:] Oh was that really a good plan?                                                                                                                                                                                                      |
| <b>Pediatrician-neonatologist:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | [not a response to mother, but a transition:] Yes, certainly.<br>[MANIPULATION IS INSERTED HERE]<br>[Compassionate:] It is a very difficult time for you.<br>[Pleasantly:] So, that is all about the respiratory support. Do you have any questions? | [not a response to mother, but a transition:] Yes, certainly.<br>[MANIPULATION IS INSERTED HERE]<br>[Compassionate:] It is a very difficult time for you.<br>[Pleasantly:] So, that is all about the nutrition. Do you have any questions? | [not a response to mother, but a transition:] Yes, certainly.<br>[MANIPULATION IS INSERTED HERE]<br>[Compassionate:] It is a very difficult time for you.<br>[Pleasantly:] So, that is all about the blood transfusion. Do you have any questions? | [not a response to mother, but a transition:] Yes, certainly.<br>[MANIPULATION IS INSERTED HERE]<br>[Compassionate:] It is a very difficult time for you.<br>[Pleasantly:] So, that is all about the lumbar puncture. Do you have any questions? |
| <b>Script Manipulations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |
| <b>Reasonable arguments (numbered)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Because (1) the monitor shows that your child has only few incidents. And (2) high flow will be more comfortable than CPAP.                                                                                                                          | Because (1) your child tolerates the current amount well. And (2) sufficient nutrition helps the growth and development of your child.                                                                                                     | Because (1) we saw from the blood values that the Hb had dropped too far. And (2) a transfusion ensures that the saturation drops will decrease.                                                                                                   | Because (1) your child may have a bacterial infection. And (2) based on the results, a targeted treatment can be chosen.                                                                                                                         |
| <b>Unreasonable arguments (numbered)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Because (1) take it from me that this is the best plan. And (2) it is also simply a logical step.                                                                                                                                                    | Because (1) I am simply an expert. And (2) other hospitals always do it like this as well.                                                                                                                                                 | Because (1) personally I think it is best. And (2) it is also just a good plan.                                                                                                                                                                    | Because (1) I just have a lot of experience. And (2) everyone does it this way.                                                                                                                                                                  |

Note. See [26] for the development of the experimental scripts and manipulations

provided arguments to support her treatment plan’ (7-point scale, completely disagree to completely agree) and (when applicable) ‘overall, how reasonable do you find the argumentation provided by the doctor?’ (7-point scale, very unreasonable to very reasonable). In addition, we included the Video Engagement Scale Short Form (VES-sf, 7-point Likert), to determine participants’ involvement with the video, both in terms of immersion and emotional impact [53,54]. This scale has previously shown good internal consistency, with Cronbach’s alphas of > .86 [53].

The survey was pilot-tested among a sample of communication researchers (N = 3) and parents (N = 12), recruited via Care4Neo. As a result of the pilot test, some small changes in wording were made to improve the legibility of the survey.<sup>4</sup>

2.7. Data cleaning and analysis

A priori, sample size was determined at a minimum of 150 ( $\alpha=0.05$ ,  $\beta=0.95$ , estimated  $\eta^2=0.1$ ) [55,56]. We performed a missing data

analysis, comparing socio-demographic and outcome measures between those who completed (N = 163) and those who did not complete (N = 115) the survey. We used Cronbach’s alpha to determine the internal consistency of the included measurement scales. Due to collinearity of outcome variables, we were unable to perform a multivariate analysis of variance (MANOVA). Therefore, we used one-way analyses of variance (ANOVA) and Pearson Chi-square tests to systematically compare our experimental groups. Because of our multiple message design, we first assessed the impact of the clinical scenarios and decision acuteness. Next, we used two-way ANOVAs to detect possible interaction effects between decision acuteness and provision of argumentation. Finally, we assessed the effect of clinicians’ argumentation on all variables of interest, using Tukey post-hoc testing where appropriate to locate between-group differences. We considered values for asymmetry and kurtosis between -2 and + 2 acceptable in order to prove normal univariate distribution [57]. When homogeneity of variance was violated, we used Kruskal Wallis tests. We analyzed the data using SPSS version 28.

<sup>4</sup> The full survey (in Dutch) is available upon request.

### 3. Results

#### 3.1. Participants

A total of  $N = 278$  parents filled out the surveys. Because no significant differences in terms of socio-demographic and outcome measures were found between those who completed ( $N = 163$ ) versus did not complete ( $N = 115$ ), we decided against multiple imputed models and continued with a complete case analysis (see Appendix C). Randomization of participants appeared successful: there were no differences across experimental video-vignettes in terms of participants' socio-demographics, parenting experience, and NICU history. Overall, the vast majority of participants were birth mothers and either married, in a registered partnership or living together. Participants were on average 34.9 years old, were highly educated, and highly health literate. Most were (self-)employed, with almost half of our participants' monthly family net income exceeding EUR 4500 per month – considerably higher than the Dutch median. Participants had a median of 2 children (range: 1–5) and 1 preterm infant (range: 1–4). Most preterm

**Table 3**  
Participant demographics.

| Characteristics              | N (%)     | $M_{\text{mean}}$ | $M_{\text{median}}$<br>(IQR) | SD  | Range |
|------------------------------|-----------|-------------------|------------------------------|-----|-------|
| <b>Parent role</b>           |           |                   |                              |     |       |
| Birth mother                 | 148       |                   |                              |     |       |
| Non-birth mother             | (90.8)    |                   |                              |     |       |
| Father                       | 2 (1.2)   |                   |                              |     |       |
|                              | 13 (8)    |                   |                              |     |       |
| <b>Age</b>                   | 163       | 34.9              |                              | 4.2 | 23–51 |
| <b>Marital status</b>        |           |                   |                              |     |       |
| Married / registered         | 106 (65)  |                   |                              |     |       |
| partnership                  | 48 (29.4) |                   |                              |     |       |
| Living together              | 9 (5.5)   |                   |                              |     |       |
| Single                       | 0 (0)     |                   |                              |     |       |
| <b>Education</b>             |           |                   |                              |     |       |
| Higher secondary education   | 4 (2.5)   |                   |                              |     |       |
| Secondary vocational         | 38 (23.3) |                   |                              |     |       |
| education                    | 67 (41.1) |                   |                              |     |       |
| Higher vocational education  | 51 (31.3) |                   |                              |     |       |
| University                   | 3 (1.8)   |                   |                              |     |       |
| PhD degree                   | 0 (0)     |                   |                              |     |       |
| <b>Employment status</b>     |           |                   |                              |     |       |
| Fulltime employed            | 34 (20.9) |                   |                              |     |       |
| Parttime employed            | 105       |                   |                              |     |       |
| Self-employed                | (64.4)    |                   |                              |     |       |
| Job seeking                  | 11 (6.7)  |                   |                              |     |       |
| Not employed/seeking /other  | 7 (4.3)   |                   |                              |     |       |
|                              | 6 (3.7)   |                   |                              |     |       |
| <b>Monthly family income</b> |           |                   |                              |     |       |
| < 2500 euro                  | 11 (6.7)  |                   |                              |     |       |
| 2501–5000 euro               | 79 (48.4) |                   |                              |     |       |
| 5001–7500 euro               | 42 (25.8) |                   |                              |     |       |
| > 7500 euro                  | 11 (6.7)  |                   |                              |     |       |
| I don't know                 | 3 (1.8)   |                   |                              |     |       |
| I do not want to say         | 17 (10.4) |                   |                              |     |       |
| <b>Health literacy</b>       | 163       | 13.2              |                              | 1.7 | 7–15  |
| <b>Number of infants</b>     |           |                   |                              |     |       |
| Overall                      | 163       |                   | 2 (1)                        |     | 1–5   |
| Preterm                      | 163       |                   | 1 (0)                        |     | 1–4   |
| <b>Hospitalization</b>       |           |                   |                              |     |       |
| <b>Duration</b>              |           |                   |                              |     |       |
| 1–3 weeks                    | 26 (16)   |                   |                              |     |       |
| >3, < 1 month                | 25 (15.3) |                   |                              |     |       |
| >1 month, < 3 months         | 84 (51.5) |                   |                              |     |       |
| > 3 months                   | 28 (17.2) |                   |                              |     |       |
| <b>Intensive care (IC)</b>   |           |                   |                              |     |       |
| Yes                          | 113       |                   |                              |     |       |
| No                           | (69.3)    |                   |                              |     |       |
| I don't know                 | 46 (28.2) |                   |                              |     |       |
|                              | 4 (2.5)   |                   |                              |     |       |
| <b>Duration IC (weeks)</b>   | 112       | 4.3               |                              | 4.2 | 0–20  |

Note. IQR: interquartile range, SD: standard deviation,

infants had spent more than 1 month in the neonatal (intensive) care unit. For all participant data, see Table 3.

#### 3.2. Scale reliability and descriptive statistics

All measurement instruments used to assess parent-related outcomes showed good overall internal consistency. The video engagement scale and subscales also demonstrated good internal consistency. For the scale reliability scores and descriptive statistics across video-vignettes, see Table 4.

#### 3.3. Manipulation checks

On average, participants demonstrated good video engagement, particularly in terms of the video's emotional impact (see Table 4). We did not find any significant differences between the twelve video-vignettes in terms of engagement, demonstrating that study participants were equally involved in viewing the videos across conditions. Notably, participants felt significantly more engaged if they had completed the survey on a mobile device rather than on a laptop/computer, particularly in terms of feeling immersed. This pattern (mobile vs. laptop/computer) was similar for perceived emotional impact, however this difference was not significant. Further, we found that participants indeed perceived the video-vignettes with (*reasonable* and *unreasonable*) argumentation as significantly more argumentative than the video-vignettes with *no* argumentation. Moreover, video-vignettes containing *unreasonable* argumentation were considered significantly less reasonable than video-vignettes with *reasonable* argumentation. As a result, we deemed our manipulations successful (see Table 5).

We did find a significant effect of the four clinical scenarios on several outcome variables: *communication stress*, *understanding*, *participation in communication*, and *empowerment*. Pairwise post-hoc comparisons of all four scenarios largely located these differences between the acute and non-acute settings. Analyses comparing the acute and non-acute scenarios indeed confirmed a significant impact of the acuteness of the decision-making setting on all outcome variables, except *trust*. A consistent pattern emerged showing that in acute settings there is overall less *understanding*, *agreement*, *participation*, *empowerment*, *trust*,

**Table 4**  
Scale reliability and descriptive statistics.

| N = 163                                | Scale description                                    | $\alpha$ | $M_{\text{mean}}$ | SD  | Range  |
|----------------------------------------|------------------------------------------------------|----------|-------------------|-----|--------|
| <b>Communication stress</b>            | 11 items, 5-point Likert scale, averaged total score | .74      | 2.9               | .5  | 1–4.2  |
| <b>Understanding</b>                   | 1 item, 7-point Likert scale                         |          | 3.8               | 2.2 | 1–7    |
| <b>Agreement</b>                       | 3 items, 7-point Likert scale, averaged total score  | .94      | 3.2               | 1.8 | 1–7    |
| <b>Participation in communication</b>  | 8 items, 5-point Likert scale, averaged total score  | .89      | 2.4               | .9  | 1–4.6  |
| <b>Empowerment</b>                     | 8 items, 7-point Likert scale, averaged total score  | .93      | 2.9               | 1.4 | 1–7    |
| <b>Clinician trust (TiOS-sf)</b>       | 5 items, 5-point Likert scale, averaged total score  | .89      | 3.1               | .9  | 1–5    |
| <b>Satisfaction with communication</b> | 1 item, 5-point Likert scale                         |          | 2.0               | 1.1 | 1–5    |
| <b>Video-engagement (VES-sf)</b>       | 8 items, 7-point Likert scale, averaged total score  | .87      | 4.5               | 1.1 | 1.25–7 |
| <b>Immersion</b>                       | 4-items, averaged total score                        | .85      | 4.2               | 1.3 | 1–7    |
| <b>Emotional impact</b>                | 4-items, averaged total score                        | .71      | 4.7               | 1.1 | 1.5–7  |

Note.  $\alpha$ : Cronbach's alpha, SD: standard deviation

**Table 5**  
Manipulation checks.

| N = 163                             | <i>M<sub>ean</sub></i> | <i>M<sub>rank</sub></i> | <i>H(df)</i> | <i>F (df)</i>     | <i>p</i> |
|-------------------------------------|------------------------|-------------------------|--------------|-------------------|----------|
| <b>Video-engagement</b><br>(VES-sf) |                        |                         |              |                   |          |
| <i>All video-vignettes</i>          |                        |                         |              |                   |          |
| Overall                             |                        |                         |              | .9 (12.6, 191.4)  | .5       |
| Immersion                           |                        |                         |              | 1.0 (20.7, 267.5) | .4       |
| Emotional impact                    |                        |                         |              | .8 (9.4170.8)     | .7       |
| <i>Mobile vs. computer</i>          |                        |                         |              |                   |          |
| Overall                             |                        |                         |              | 4.1 (5.1, 198.9)  | .04      |
| <b>Mobile</b>                       | 4.6                    |                         |              |                   |          |
| <b>Computer</b>                     | 4.2                    |                         |              |                   |          |
| Immersion                           |                        |                         |              | 5.1(8.8, 278.9)   | .03      |
| <b>Mobile</b>                       | 4.4                    |                         |              |                   |          |
| <b>Computer</b>                     | 3.9                    |                         |              |                   |          |
| Emotional impact                    |                        |                         |              | 2.2 (2.4, 177.8)  | .14      |
| <b>Mobile</b>                       | 4.8                    |                         |              |                   |          |
| <b>Computer</b>                     | 4.5                    |                         |              |                   |          |
| <b>Perceived argumentation</b>      |                        |                         | 18.6(1)      |                   | <.001    |
| Argumentation                       |                        | 93.4                    |              |                   |          |
| No argumentation                    |                        | 60.8                    |              |                   |          |
| <b>Perceived reasonableness</b>     |                        |                         | 70.8(1)      |                   | <.001    |
| Reasonable                          |                        | 76.0                    |              |                   |          |
| Unreasonable                        |                        | 27.2                    |              |                   |          |

Note. *H*: Kruskal-Wallis test, *F*: Fisher's test (analysis of variance), *df*: degrees of freedom

and *satisfaction* and more *communication stress* than in non-acute settings. However, there was no statistically significant interaction effect between the acuteness of the scenarios and provision of argumentation (see Appendix D). Therefore, we proceeded with our main analyses by pooling all *reasonable*, *unreasonable* and *no argumentation* scenarios.

### 3.4. Effects of (un)reasonable argumentation on parent-related outcomes

Our analyses showed a statistically significant ( $p < 0.001$ ) and notably large ( $\eta^2$ : 0.13–0.38) effects of clinicians' use of argumentation across all parent-related outcomes (see Table 6). For all outcomes, a similar pattern emerged. That is, clinicians' use of *reasonable* argumentation led to higher *understanding*, *agreement*, *participation in communication*, *parent empowerment*, *trust*, and *satisfaction with communication* than *no argumentation*. *No argumentation*, in turn, led to higher scores compared to *unreasonable* argumentation. For *communication stress* this pattern was reversed, with *unreasonable* argumentation leading to more *communication stress* than *no argumentation* and *reasonable*

argumentation. Post-hoc analyses revealed that, depending on the outcome, differences were located between the *reasonable* condition versus the conditions with *unreasonable* and *no* argumentation, or between the *unreasonable* condition versus the *reasonable* and *no* argumentation conditions on the other hand. This means that, generally, there was a consistent, positive effect of *reasonable* argumentation compared to *unreasonable* argumentation.

## 4. Discussion and conclusion

### 4.1. Discussion

Does argumentation matter? We asked this question approximately a decade ago, in a systematic review exploring the role of argumentation in conversations between doctors and patients about treatment [58]. Since, theoretical and empirical investigations of the use of argumentation in doctor-patient communication have expanded considerably [8, 11–16,19–21,23,26,27,59,60], with the majority of studies also using real-life data. Yet, quantitative studies examining the effects of clinicians' argumentation, remained scarce. The present study sought to fill this void, by experimentally testing the effects of clinicians' use of argumentation on outcomes, particularly in the context of neonatal care. Starting from the NICU Communication Framework [29–31], we assumed that clinicians' provision of *reasonable* arguments (vs. *unreasonable* or *no* arguments) would improve parental *coping*, *knowledge*, *participation*, *parenting*, and *satisfaction*.

Based on our findings, we can now unequivocally say: neonatal care clinicians' provision of (reasonable) argumentation matters. The present study shows that clinicians' use of argumentation can have a significant and – for communication effects – notably strong impact on the outcomes of conversations about treatment. The pattern that emerged in our data was consistent, showing that *reasonable* arguments lead to lower *communication stress* and higher *understanding*, *agreement*, *participation in communication*, *parent empowerment*, *trust*, and *satisfaction with communication* than *no argumentation*. In turn, *no argumentation* led to improved outcomes compared to *unreasonable* argumentation. This confirmed our hypothesis. Noticeably, there seems to be a pronounced positive effect of providing *reasonable* argumentation and a clear negative effect of providing *unreasonable* argumentation. This implies that clinicians should ideally provide reasonable argumentation and should prefer to use no arguments over providing unreasonable argumentation.

While in acute settings, parent-related outcomes were significantly worse than in non-acute settings, provision of *reasonable* argumentation had a positive effect, regardless of the setting. Nonetheless, on average, argumentation effects were much weaker in the acute decision-making

**Table 6**  
Effects of argumentation on parent-related outcomes.

| Measure                                | Reasonable             |           |                         |                                                | Unreasonable           |           |                         |                                                | No argumentation       |           |                         |                                                | <i>H</i> | <i>F (df)</i>         | $\eta^2$ |
|----------------------------------------|------------------------|-----------|-------------------------|------------------------------------------------|------------------------|-----------|-------------------------|------------------------------------------------|------------------------|-----------|-------------------------|------------------------------------------------|----------|-----------------------|----------|
|                                        | <i>M<sub>ean</sub></i> | <i>SD</i> | <i>M<sub>rank</sub></i> | <i>M<sub>edian</sub> (25th, 75th quartile)</i> | <i>M<sub>ean</sub></i> | <i>SD</i> | <i>M<sub>rank</sub></i> | <i>M<sub>edian</sub> (25th, 75th quartile)</i> | <i>M<sub>ean</sub></i> | <i>SD</i> | <i>M<sub>rank</sub></i> | <i>M<sub>edian</sub> (25th, 75th quartile)</i> |          |                       |          |
| <b>Communication stress</b>            |                        |           | 63.8                    | 2.7 (2.2, 3.0)                                 |                        |           | 106.8                   | 3.1 (2.8, 3.4)                                 |                        |           | 78.1                    | 2.9 (2.4, 3.2)                                 | 22.6(2)* |                       | .13      |
| <b>Understanding</b>                   |                        |           | 110.5                   | 5.5 (4.0, 5.5, 6.0)                            |                        |           | 58.1                    | 2.0 (1.0, 4.0)                                 |                        |           | 73.4                    | 3.0 (1.0, 5.8)                                 | 36.5(2)* |                       | .22      |
| <b>Agreement</b>                       |                        |           | 119.2                   | 4.7 (3.7, 6.0)                                 |                        |           | 48.4                    | 1.3 (1.0, 2.7)                                 |                        |           | 74.9                    | 2.7 (1.2,3.8)                                  | 62.1(2)* |                       | .38      |
| <b>Participation in communication</b>  |                        |           | 120.1                   | 3.1 (2.6, 3.5)                                 |                        |           | 51.3                    | 1.9 (1.5, 2.3)                                 |                        |           | 71.5                    | 2.3 (1.6, 2.9)                                 | 60.5(2)* |                       | .37      |
| <b>Empowerment</b>                     |                        |           | 101.3                   | 3.1 (2.5, 4.4)                                 |                        |           | 55.7                    | 2.0 (1.5, 2.8)                                 |                        |           | 86.1                    | 3.0 (1.9, 4.0)                                 | 25.4(2)* |                       | .15      |
| <b>Clinician trust</b>                 | 3.5                    | .6        |                         |                                                | 2.2                    | .8        |                         |                                                | 3.3                    | .8        |                         |                                                |          | 48.9*<br>(50.5, 83.2) | .38      |
| <b>Satisfaction with communication</b> |                        |           | 109.0                   | 3.0 (2.0, 3.75)                                |                        |           | 49.3                    | 1.0 (1.0, 2.0)                                 |                        |           | 84.2                    | 2.0 (1.0, 3.0)                                 | 47.1(2)* |                       | .28      |

Note. *H*: Kruskal-Wallis test, *F*: Fisher's test (analysis of variance), *df*: degrees of freedom

\*  $p < .001$

scenarios. While these effects were not statistically significant, they may be clinically relevant: in acute settings, the severity and impact of the medical situation may trump any effects generated by clinicians' argumentative behaviors. Possible communication differences in real-life non-acute and acute decision-making settings are deserving of further attention. Furthermore, in clinical practice, argumentative interactions are currently mostly doctor-initiated and patients and families often only display doubts and concerns implicitly [11–14,59]. The present study also focused solely on doctor-led argumentative interactions, with the parents in a less prominent role. Therefore, to properly empower parents and ensure balanced conversations between clinicians and parents, future studies should also be dedicated to examining and improving parents' argumentative behaviors in clinical practice. Research across different fields (e.g. medicine, law, education) shows that argumentation is a tangible and teachable skill [5,61,62]. As such, we firmly believe that future studies and clinical practice should focus on teaching clinicians as well as parents how to engage in reasoned treatment decision-making conversations.

This study has several strengths, including the close involvement of parent representatives on the research team and the systematic development of our video-vignettes – ensuring theoretically sound and realistic experimental manipulations. The use of the NICU Communication Framework as a theoretical basis for the conceptualization and operationalization of variables is also a strength. Also, we were able to attain high experimental control by using short video fragments with clear manipulations.

Nonetheless, there are also limitations to the study. First, all video-vignette experiments are inherently artificial, despite efforts to approximate real-life interactions as much as possible. While this may affect the generalizability of our findings, parents in clinical practice are likely even more engaged than *analogue parents*. This renders found effects potentially stronger. Notably, survey modality (mobile-friendly or computer) impacted participants' immersion in the video-vignettes. This resonates with Sammut, Griscti and Norman [63], who note that with the increasing use of mobile devices, surveys developed for mobile phones may result in better response rates. Future studies may explore whether different survey modalities, including also *virtual reality*, can further enhance the ecological validity of video-vignette research. Second, our sample largely consisted of highly educated and highly health literate birth mothers. While this is common in research among parents of neonates, researchers should deliberately recruit varied samples. This may be particularly important as research has shown gender differences in terms of argumentative predispositions [64]. A study from 2020 among a student sample showed that Dutch females are more apprehensive about argumentative exchanges and more insistent on proper social relations when engaged in argumentation than males, who have a more aggressive approach to argumentation [65]. Thus, the inclusion of mostly birth mothers in our sample, may have affected the results. In addition, we also purposefully excluded parents experiencing anxiety and depression. Yet, this may have caused bias in our sample. Third, the number of participants who did not complete the survey was quite high. We attributed this to the study duration and set-up, requiring participants to view a video. Data showed some participants entered the study several times before completing the survey – indicating high motivation. At the same time, the study may have placed an emotional burden on participants, causing some to drop-out. Fourth, all unreasonable arguments included in the present study amounted to what could be labeled as a 'paternalistic fallacy' – a dismissal of the parents' perspective, favoring the doctor's authority. Other uses of unreasonable arguments (e.g., logically invalid or irrelevant arguments, cf. pragma-dialectical theory of argumentation [22–25]) may impact parents differently. Future studies may examine the effects of other unreasonable arguments, across other decision-making scenarios and contexts.

## 4.2. Conclusion

Clinicians' use of argumentation to support treatment decisions can impact parent-related outcomes in neonatal care, including, as shown in the present study: *communication stress*, *understanding* and *agreement*, *participation* in communication, *empowerment*, *clinician trust* and *satisfaction* with communication. Importantly, there is a difference between clinicians' *reasonable* and *unreasonable* argumentation, with the former having a pronounced positive effect across non-acute and acute decision-making scenarios. These findings further advance the literature on argumentation in treatment decision-making conversations. This study also adds to theoretical conceptualizations of interpersonal health communication, by further elucidating the pathways that link clinicians' communicative behaviors to short- and long-term consultation outcomes. Moreover, it provides further support for the NICU Communication Framework, which outlines the particular functions and effects of clinician-parent interactions in neonatal care. Perhaps most importantly, our findings warrant attention to clinical argumentation as an important communication skill that is core to patient-centered communication. We believe it is time that *reasoned decision-making* is advocated as a good clinical practice.

## 4.3. Practice implications

Based on our findings, clinicians in neonatal care should seek to support their treatment decisions and recommendations with reasonable arguments, to improve parent-related outcomes. Previous studies in neonatal care have demonstrated that parents expect clinicians to provide arguments in both non-acute and acute decision-making settings, to enhance parents' feeling involved in the decision – even if they ultimately cannot make that decision. Moreover, there is high consensus between clinicians and parents on what constitutes a 'good' argument, not only in terms of reasonableness but also in terms of content. Taken together, these findings provide a hands-on starting point for (1) determining good argumentative practices across clinical scenarios and (2) designing evidence-based, clinical argumentation trainings for neonatal care and beyond.

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## CRediT authorship contribution statement

**Nanon Labrie:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Visualization, Writing – original draft, Writing – review & editing. **Anne van Kempen:** Writing – review & editing, Methodology. **Liesbeth van Vliet:** Writing – review & editing, Methodology. **Nicole van Veenendaal:** Formal analysis, Writing – review & editing, Methodology. **Marleen Kunneman:** Writing – review & editing, Methodology. **Sylvia Obermann-Borst:** Data curation, Writing – review & editing.

## Declaration of Competing Interest

The authors declare to have no competing interests.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.pec.2024.108625](https://doi.org/10.1016/j.pec.2024.108625).

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