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Using expert opinion rounds to develop valid and realistic manipulations for experimental video-vignette research: Results from a study on clinicians' (un)reasonable argumentative support for treatment decisions in neonatal care

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ABSTRACT

Objective: To develop valid and realistic manipulations for video-vignette research using expert opinion rounds, in preparation of an experimental study on clinicians' (un)reasonable argumentative support for treatment decisions in neonatal care.
Methods: In three rounds, N = 37 participants (parents/clinicians/researchers) provided feedback on four video-vignette scripts and completed listing, ranking, and rating exercises to determine which (un)reasonable arguments clinicians may provide to support treatment decisions.
Results: Round 1: participants deemed the scripts realistic. They judged that, on average, clinicians should provide two arguments for a treatment decision. They listed 13–20 reasonable arguments, depending on the script. Round 2: participants ranked the two most salient, reasonable arguments per script. Round 3: participants rated the most plausible, unreasonable arguments from a predefined list. These results guided the design of 12 experimental conditions.
Conclusion: Expert opinion rounds are an effective method to develop video-vignettes that are theoretically sound and ecologically realistic and offer a powerful means to include stakeholders in experimental research design. Our study yielded some preliminary insights into what are considered prevalent (un)reasonable arguments for clinicians' treatment plans.
Practice implications: We provide hands-on guidelines on involving stakeholders in the design of video-vignette experiments and the development of video-based health communication interventions – both for research and practice.

1. Introduction

Video-vignettes are increasingly used in experimental studies on clinician-patient interaction to assess the effects of clinicians' communicative behaviors on affective (e.g., anxiety), cognitive (e.g., information recall), and behavioral (e.g., adherence) patient-related outcomes [1–13]. Video-vignettes are scripted, roleplayed scenarios of clinician-patient interactions that allow for the systematic isolation and manipulation of specific (non)verbal communicative behaviors across experimental conditions; something that is practically and ethically infeasible when conducting experimental trials in clinical practice. Study participants view the video-vignettes while imagining to be the

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video-patient. This approach requires relatively high levels of involvement from participants, often referred to as 'analogue patients' [14,15]. Several studies have shown that the use of analogue patients is a valid and reliable approach to study participants' perceptions of clinician-patient interactions [15–18]. Nonetheless, due to the relatively artificial set-up of video-vignette research, achieving high ecological validity (realism) – in addition to high internal validity (control) – remains a challenge.

To guide the design and implementation of video-vignettes in clinician-patient interaction research, Hillen et al. and van Vliet et al. have proposed a systematic, stepwise approach including different phases [1,3]. This approach seeks to enhance the ecological validity of video-vignette research by encouraging expert consultation to determine script realism and to pilot-test videos. While the authors state that experts may also be consulted to ensure that "the proposed manipulations are distinguishable, yet not caricatures of normal practice" [1,19], they show that only few studies have actually done so in a systematic way [20,21]. More often, script manipulations are developed based solely on theoretical assumptions or empirical evidence [1,3]. While this is crucial to ensure that manipulations are internally valid, systematic expert consultation may help in the development of manipulations that are not only theory-driven but also relevant and relatable for clinicians and patients. Several studies have argued how integration of expert knowledge throughout the different stages of the research process can benefit outcomes, including study relevance, quality, and appropriateness [22–25]. More so, expert consultation to design experimental manipulations can help to reduce researcher bias, e.g., in terms of theoretical assumptions as well as how medical practice is portrayed.

The present study aims to outline a systematic procedure to develop valid and realistic script manipulations for video-vignette experimental research, using expert opinion rounds. Doing so, this study reports on the development of video-vignettes in preparation of an experimental study in the context of neonatal care – acute and non-acute (and often long-term) hospital care for infants who are born preterm or ill. These video-vignettes seek to test the effects of pediatrician-neonatologists' use of *reasonable argumentation* to support treatment plans as compared to *unreasonable* or *no argumentation* on parents' treatment acceptance and their perceptions of clinicians [5,26–28]. Here, using pragma-dialectical argumentation theory, the use of *reasonable* argumentation (or theoretically 'sound' argumentation) is defined as advancing (one or more) reasons that contribute to resolving a possible difference of opinion or doubt concerning the suitability of the proposed treatment plan, while the use of *unreasonable* argumentation (or 'fallacious' argumentation) refers to putting forward reasons that hinder the resolution of such a disagreement [26,28,29]. Previous studies show that while both types of argumentation occur in actual medical practice, the use of reasonable argumentation in treatment decision-making conversations has favorable outcomes [5,26–28,30–32] The expert opinion rounds reported on in the present paper are used to assess the realism of the developed video-vignettes and – more importantly – to determine the salient (un)reasonable arguments to be used as manipulations in the experimental conditions. By detailing our procedures, we aim to provide hands-on guidance for future video-vignettes development.

2. Methods

2.1. Research team and parent involvement

Our multidisciplinary research team included medical communication scholars, pediatricians-neonatologists, and parent representatives. All members of the research team had prior experience with clinician-parent interaction across different levels of NICU care (level 1–4, [33]) in different Dutch hospitals, either as clinicians or parents.

2.2. Participants

Participants in the expert opinion rounds were actively approached through the authors' own networks. We included parents whose infants had been previously hospitalized in a neonatal care unit due to premature birth of illness (<37 weeks of gestation); neonatal nurses and nurse practitioners; pediatrician-neonatologists (in training); and researchers in the field of pediatrics-neonatology and/or medical communication. We sought to achieve a balance in participants' gender, seniority, and expertise. Because studies in neonatal care often have an over-representation of birth-mothers' perspectives, we specifically reached out to birth partners, too. We did not include parent couples in our sample. We purposefully included participants with expertise in neonatal *intensive* care (level 3–4) as well as in *high/medium* care (level 2) from across the Netherlands [33].

2.3. Procedures

Participants were invited to participate in three online expert opinion rounds (using Qualtrics), over the course of four weeks in June-July 2021. Participants were informed that their input was anonymous and would be used to design realistic and accurate scripts for experimental videos of conversations between clinicians and parents about treatment decisions in neonatal care. They were explicitly informed that the planned experimental study focused on clinicians' use of argumentation to support such decisions. Prior to starting the expert opinion rounds, participants were told that each round would take between 5 and 15 min to complete and that they would receive a small gift upon completion of three rounds (EUR 10 store credit). At the end of the third round, participants were invited to take part in an optional, additional round in August 2021, in which they could comment on a video version of the script.

2.4. Materials

2.4.1. Developing basic video scripts

In creating the video-vignettes concerning treatment decisions in neonatal care, we adhered to the procedures outlined by Hillen et al. and van Vliet et al. [1,3]. Yet, to specifically enhance the validity and realism of our experimental manipulations, we introduced several steps to these procedures, encompassing the expert opinion rounds (see Fig. 1). Our stepwise procedures are described below, focusing on Phase II (developing valid scripts) through Phase IV (converting scripts into videos) of video-vignette research.

Step 1. We first recorded several conversations between clinicians and parents of preterm infants in a Dutch neonatal unit (level 2). Recordings all concerned family-centered rounds, during which medical doctors, nurses, and parents jointly discuss infants' treatment. Recordings provided input for our video scripts, in terms of dialogue as well as set dressing. We also consulted educational materials for parents of preterm infants and evidence-based publications about common complications in preterm infants and treatment options. We then selected four common treatment decisions for hospitalized preterm infants to provide the medical backdrop for the video scripts, to allow for generalization beyond a single treatment plan (multiple message design). We considered two decisions as 'non-acute' (*decreasing respiratory support*, *increasing nutrition intake*) and two as 'acute' (*giving a blood transfusion, performing a lumbar punction*). We selected these particular decisions (a) because of their prevalence and relevance across neonatal care levels, (b) to represent treatments for conditions across the anatomic tracts, and (c) to ensure that parents would easily recognize the described conditions and treatment plans and thus engage with the vignettes. We distinguished between non-acute and acute decisions, because previous studies showed that parents have different expectations in terms of clinicians' argumentative support for these decisions. In non-acute settings, parents expect the pediatrician-neonatologist to

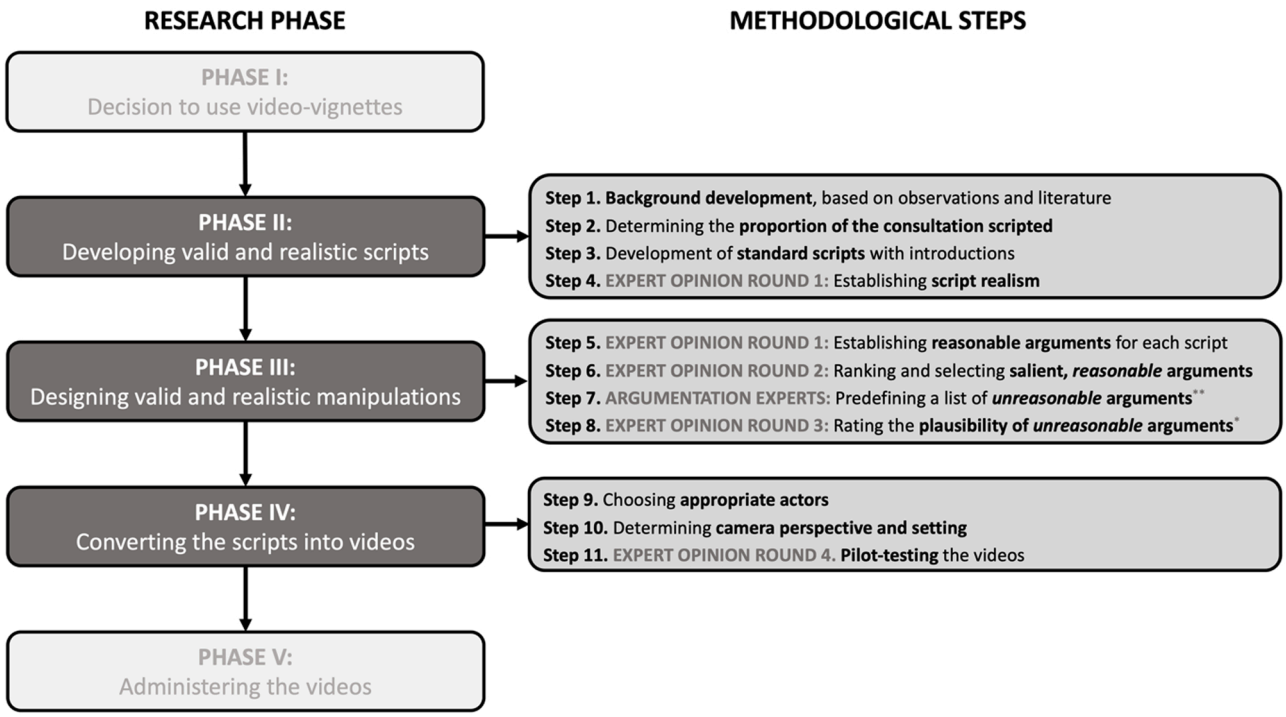

Fig. 1. *Stepwise procedures to create video-vignettes. Note.* These stepwise procedures align with Hillen et al. and van Vliet et al. [1,3]. We introduce the use of expert opinion rounds to develop the experimental manipulations and, as such, steps 5–8 are new. Hillen et al. and van Vliet et al. also include several methodological steps for Phase V. These are not included in the present paper.

provide argumentation *prior* to treatment to allow for feel actively involved in the decision-making process. In acute settings, argumentation is expected in *hindsight* so that parents (at least) feel informed about, and included in, their infants' care [34–36]. All four decisions were considered 'effective' decisions, thus calling for clinician argumentation rather than a process of shared decision-making. Effective decisions concern treatment plans that are supported by clear medical evidence, that leave little room for scientific uncertainty, and that are not sensitive to parents' preferences. As such joint decision-making about the preferred treatment option is not appropriate [37]. In such cases, however, in order to convince parents of the suitability of the treatment plan and thereby include them in the care process (as well as to obtain informed consent), clinician argumentation in support of the treatment decision is called for [5].

Step 2. Next, we developed a basic video script (excluding manipulations) for each of the four treatment decisions. Scripts consisted of short turn-taking sequences between a neonatologist, a nurse, and the parents of a preterm infant. We opted for short fragments rather than full-length consultations, to be able to properly isolate the communicative mechanism (argumentation) under study. When possible, we used exact excerpts and direct quotes from actual consultations and information materials in the scripts to enhance ecological validity.

Step 3. The four basic scripts were discussed and revised among the project team. We added a general introduction to the scripts, asking participants to imagine to be the parents in the scenario. For an overview of the basic scripts and the introduction, see Table 1.

Step 4 – Round 1. We then started the expert opinion rounds. In Round 1, participants first completed information about their gender, age, and expertise (i.e., parent, medical doctor, neonatal nurse, researcher). Next, they were asked to read the four basic scripts and to rate (on a scale from 1 to 10, ranging from *very unrealistic* to *very realistic*), and comment on, the realism of the dialogues.

2.4.2. Developing manipulations using expert opinion rounds

Step 5. To develop our experimental manipulations, participants in Round 1 were then asked how many arguments, generally speaking, a pediatrician-neonatologist should provide to support a treatment decision to parents. Participants were instructed to think of an average situation and of good quality arguments. Arguments were explicitly defined as: "The reasons that someone gives in support of a claim, a viewpoint, an opinion, or a plan. Synonyms for arguments: reasons, proof, motives, justifications, support." Next, they were asked for each of the four basic scripts to list all possible arguments the pediatrician-neonatologist could use to support the treatment decision (*respiratory support:* My suggestion would be to decrease the level of respiratory support from continuous positive airway pressure (CPAP) to high flow; *nutrition*: My suggestion would be to increase the amount of nutrition from 20 to 23 ml per feeding; *blood transfusion*: we had to perform a blood transfusion, *lumbar puncture:* we had to perform a lumbar puncture). Following Round 1, we revised all scripts.

Step 6 – Round 2. We fed back the results from Round 1 to the participants. Then, we asked participants for each of the four treatment decisions to rank their top five from all the arguments that were listed in Round 1. Participants could not see who contributed the arguments. This procedure resulted in ranked lists of arguments per treatment decision. We then discussed these results from Round 2 with three medical argumentation specialists (see Acknowledgements), to make a final selection of salient, medically sound, and theoretically *reasonable* arguments per treatment decision.

Step 7. Together with the medical argumentation specialists, we compiled a list of fifteen *unreasonable* forms of argumentation. This list was based on the pragma-dialectical theory, a prominent argumentation theory that has been previously used in clinician-patient interaction research and that defines several forms of unreasonable argumentation [5,26,28–31,38,39]; empirical evidence concerning argument (un) reasonableness [27]; and observations of uses of unreasonable argumentation in clinical practice, in the context of neonatal care, as well as general practice and oncology [30,31,38]. Unreasonable arguments were not scenario-specific and included examples like 'I simply have a lot of expertise' (*ad verecundiam*, unreasonable authority argument), 'we

Table 1
Basic video-vignette scripts and general introduction.

Introduction – Voiceover				
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.				
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 short fragment of such a conversation. In this part of the conversation, the doctor explains the treatment plan. The nurse is also present.				
Try to imagine to be the parent in the video.				
Basic Scripts – No Argumentation				
	Respiratory support	**Nutrition**	**Blood transfusion**	**Lumbar puncture**
Pediatrician-neonatologist:	We should also talk about respiratory support. My suggestion would be to decrease the level of respiratory support from CPAP to high flow.	We should also talk about nutrition. My suggestion would be 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.
Nurse:	[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.
Father:	[Worried:] Hmm, ok…?	[Worried:] Hmm, ok…?	[Worried:] Hmm, ok…?	[Worried:] Hmm, ok…?
Mother:	[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?
Pediatrician-neonatologist:	[not a response to mother, but a transition:] Yes, certainly.	[not a response to mother, but a transition:] Yes, certainly.	[not a response to mother, but a transition:] Yes, certainly.	[not a response to mother, but a transition:] Yes, certainly.
	[MANIPULATION IS INSERTED HERE]	**[MANIPULATION IS INSERTED HERE]**	**[MANIPULATION IS INSERTED HERE]**	**[MANIPULATION IS INSERTED HERE]**
	[Compassionate:] It is a very difficult time for you.	[Compassionate:] It is a very difficult time for you.	[Compassionate:] It is a very difficult time for you.	[Compassionate:] It is a very difficult time for you.
	[Pleasantly:] So, that is all about the respiratory support. Do you have any questions?	[Pleasantly:] So, that is all about the nutrition. Do you have any questions?	[Pleasantly:] So, that is all about the blood transfusion. Do you have any questions?	[Pleasantly:] So, that is all about the lumbar puncture. Do you have any questions?

actually always do it in this way' (*ad populum*, unreasonable argument by numbers) (see Appendix A).

Step 8 – Round 3. We then fed back our findings from Round 2 to participants. We explained that everyone who communicates in real-life will use unreasonable arguments on occasion and that this also applies to clinicians and their patients. Then, we instructed participants to review the list of unreasonable arguments and judge these as possible support for a treatment decision. Participants were not explicitly told that listed arguments were all theoretically unreasonable. First, participants scored the *reasonableness* of each of these fifteen arguments on a scale from *very unreasonable* (1) to *very reasonable* (5) [5,27]. Then, participants scored the same arguments on *plausibility* in a real-life setting on a 5-point Likert scale ranging from *very implausible* (1) to *very plausible* (5). Following Round 3, we selected the arguments that were, on average, perceived as unreasonable, but also deemed plausible in neonatal practice. We fed back these results to the participants and finalized our video-vignettes, including all manipulations. An overview of all script manipulations and experimental conditions (3 ×4 factorial design) can be found in Tables 2 and 3.

2.4.3. Converting scripts into videos

Step 9. We hired professional actors to play the roles of pediatrician-neonatologist, nurse, and parents (a mother and father) in the video-vignettes. All actors had either prior experience creating video-vignettes for research purposes, or had personal experiences as parents of preterm infants.

Step 10. We opted for a multi-camera set-up, in which the viewer sees the video-vignette from an outsider perspective (rather than, e.g.,

Table 2
Video-vignette manipulations following the expert opinion rounds.

Script Manipulations				
	Respiratory support	Nutrition	Blood transfusion	Lumbar puncture
Reasonable arguments (numbered)	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.
Unreasonable arguments (numbered)	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.
Types of unreasonable arguments	(1) *Evading the burden of proof: vouching personally* (2) *Evading the burden of proof: presenting plan as self-evident*	(1) *Ad verecundiam: authority argument* (2) *Ad populum: appeal to numbers*	(1) *Evading the burden of proof: vouching personally* (2) *Evading the burden of proof: presenting plan as self-evident*	(1) *Ad verecundiam: authority argument* (2) *Ad populum: appeal to numbers*

through the eyes of the parents, see Appendix B), to allow them to identify with the mother and father in the video.

Step 11 – Round 4. Following a 1-day rehearsal with a professional film crew (director, cameraman, set dresser), we invited participants to take part in a final, optional round, which consisted of a viewing of a single video (*respiratory support,* reasonable argumentation). We asked participants to provide written feedback on the set and set-dressing, acting (e.g., intonation, interactions, tempo), filming and video quality, and any other aspects they noticed. We implemented their feedback during the final filming day. Subsequently, all videos were edited by the film crew. Videos (in Dutch) are available upon request.

2.5. Data analysis

We analyzed the data of the expert opinion rounds using descriptive statistics. In addition, we used pragma-dialectical argumentation analysis to categorize the reasonable arguments listed by the participants according to their schematic make-up: arguments were labeled as *symptomatic* arguments if they referred to a fact, symptom, or characteristic supporting the treatment decision; as *comparison* arguments if they referred to a relation of resemblance; and as *causal* arguments if they referred to a cause-effect relationship [26,28,29]. Similarly, we labeled the unreasonable arguments using pragma-dialectical characterizations of unreasonable arguments [26,28,29]. These analyses allowed us to make a consistent selection from participants' top-listed arguments across the four treatment decisions.

2.6. Ethical considerations

The protocol for this study is registered with the Dutch Trial Registry (Trial NL7997) and complies with the ethical guidelines of the Vrije Universiteit Amsterdam (VCWE-2019–132). The project was submitted for consideration to the Medical Ethical Committee of the Amsterdam UMC, location VUmc, which judged that the study is not subject to the Medical Research Involving Human Subjects Act (2019.596).

3. Results

3.1. Round 1 (steps 4–5)

In total, N = 41 participants were approached. One did not respond, three canceled prior to starting the study, resulting in N = 37 participants in Round 1 (see Table 4). The scripts for the non-acute treatment decisions scored well on realism, with mean scores of a 7.2 (*respiratory support*, *SD* = 2.1, range: 2–10) and a 7.5 (*nutrition*, *SD* = 1.8, range: 3–10). The scripts for the acute treatment decisions scored lower on realism, with mean scores of a 5.1 (*blood transfusion*, *SD* = 2.7, range: 1–10) and a 4.8 (*lumbar puncture*, *SD* = 2.8, range: 1–10). Comments mostly pertained to the minor role of the nurse, which was deemed not realistic by participants, and the fact that, in both acute scenarios, it seemed that parents had been left in the dark for an entire night about their infant's medical condition, despite the major treatment decisions that were made by the pediatrician-neonatologist. Some participants responded that this is 'not how it should be done' or 'not how I would do it'. Notably, however, several participants commented that they experienced highly similar scenarios in clinical practice.

Table 4
Participants expert opinion rounds.

Characteristics	Round 1	Round 2	Round 3
Participants (%)	37	33	28
male	12 (32.4%)		
female	25 (67.6%)		
other / prefer not to say	0 (0%)		
Age (SD, range)	40.0 (9.1, 25–60)		
Expertise* (%)	13** (31.7)	12	10
parent	11 (26.8)	(34.3)	(31.3)
medical doctor	10 (24.4)	12	9 (28.1)
nurse	7 (17.1)	(34.3)	10
researcher		8 (22.9)	(31.3)
		3 (8.6)	3 (9.4)
Infants' gestational age	range: 26–36 weeks		
Clinicians' work experience (SD, range)	16.2 years (7.7, 4–28)		

* *Note.* Some participants had dual roles. ** no parent couples were included.

On average, participants judged that 2.2 arguments (*SD* =0.9, range: 0–4) are sufficient for a clinician to support a treatment decision. Participants listed a total of 13–21 unique arguments for each scenario (*respiratory support:* N = 20, *nutrition*: N = 13 nutrition, *blood transfusion:* N = 21, *lumbar puncture:* N = 16). For an overview, see Appendix C.

3.2. Round 2 (steps 6–7)

N = 33 participants took part in Round 2 (see Table 3). Following participants' feedback in Round 1, we gave the nurse a more distinct role in the scripts and in the scripts for the acute treatment decisions we made explicit that the treatment discussion takes place immediately following the acute procedure (rather than hours later) and that informed consent was obtained from the parents prior to action.

The ranking exercises resulted in a clear top three of reasonable arguments for each of the four treatment decisions (see Appendix D). For each treatment decision, we selected two arguments – based on the finding in Round 1 concerning the average number of arguments needed. For reasons of uniformity across experimental conditions, for each treatment decision we selected one *symptomatic* argument (pointing out a medical fact or observation supporting the treatment decision) and one *causal* argument (pointing out the positive consequences of adhering to the treatment decision) (see Table 2).

3.3. Round 3 (step 8)

N = 28 participants completed the survey (see Table 3). Noticeably, participants recognized all unreasonable arguments as such, but nonetheless deemed many of them also very plausible (see Table 5). Based on the mean scores per argument, we made a selection of arguments that were considered quite *plausible* (score > 2.5) yet simultaneously also *unreasonable* (score < 3.0 on reasonableness). Only one exception was made, for reasons of uniformity across experimental conditions. For each of the treatment decisions we selected one unreasonable argument referring to the pediatrician-neonatologist's own expertise/authority (cf. pragma-dialectics: *ad verecundiam* or *personally vouching for the de-*

Table 3
Experimental conditions (3 ×4 factorial design).

	Clinical scenario			
	Non-acute treatment decision		Acute treatment decision	
	Respiratory support	Nutrition	Blood transfusion	Lumbar puncture
Argumentation:	(1) *No*	(4) *No*	(7) *No*	(10) *No*
	(2) *Reasonable*	(5) *Reasonable*	(8) *Reasonable*	(11) *Reasonable*
	(3) *Unreasonable*	(6) *Unreasonable*	(9) *Unreasonable*	(12) *Unreasonable*

Table 5
Mean reasonableness and plausibility scores for unreasonable arguments in Round 3.

	Reasonableness scores *ranging from 1 (very unreasonable) to 5 (very reasonable)*			Plausibility scores *ranging from 1 (very implausible) to 5 (very plausible)*		
	N	Mean	*SD*	N	Mean	*SD*
This does not require an explanation	29	1.10	0.41	28	1.50	0.64
This is actually all I will say about it now	29	1.45	0.74	28	1.89	1.17
It is actually self-evident	29	1.76	0.91	28	2.14	1.11
Take it from me this is the best plan	29	1.79	0.90	28	2.68	1.12
Everyone always does it in this way	29	2.24	0.95	28	3.64	1.06
What alternative would you see?	29	2.24	1.24	28	2.57	1.10
Other hospitals also always do it in this way	29	2.28	1.10	28	3.18	1.12
It is also just a good plan	29	2.31	0.97	28	3.11	0.96
I simply have a lot of experience with it	29	2.69	1.17	28	3.89	0.79
What would you think is best?	29	2.79	1.37	28	2.64	1.19
We should take good care of your child	29	2.83	1.58	28	3.68	1.19
I am simply an expert in this respect	29	2.90	1.26	28	3.36	0.91
Personally, this seems best	29	2.97	1.09	28	3.36	0.95
We know this is best	29	3.34	1.23	28	3.79	0.96
It is just a logical step	29	3.45	1.06	28	4.14	0.45

Note. Based on these scores, per scenario two arguments were selected: one argument that refers to the personal authority or expertise of the doctor as a reason for the accepting the treatment plan and one argument that justifies the treatment plan by asserting that this is simply logical or how it is always done. Selected unreasonable arguments marked in bold.

cision) and one unreasonable argument referring to the logical nature of the treatment plan from a medical perspective (cf. pragma-dialectics: *ad populum* or *presenting the plan as self-evident*) [26–29]. The division of unreasonable arguments across non-acute and acute conditions was kept constant (see Table 2).

3.4. Round 4 (step 11)

Participants' written feedback on the video scenario, acting, filming, and set dressing mostly pertained to the introduction with voice-over, which appeared too lengthy. Further, minor adaptations were made to the set and intonation and body language of the actors. In particular, the female actor portraying the doctor was initially perceived as somewhat aloof. As such, she adapted her tone and posture to display more warmth. No other changes were made to the scripts. Following filming and editing, the 12 video-vignettes were embedded in an online survey, as part of an experimental study (not reported here).

4. Discussion and conclusion

4.1. Discussion

In this paper, we outlined the systematic steps for involving important stakeholders in the design of experimental manipulations for video-vignette research. Doing so, we reported on the development of video-vignettes in preparation of an experimental study on clinicians' (un) reasonable argumentative support for treatment decisions in neonatal care. By using expert opinion rounds (involving parents, clinicians, and researchers) to develop our experimental manipulations, we sought to enhance the validity and realism of our video-vignettes. We introduced the expert opinion rounds as an addition to the stepwise guidelines for video-vignette design proposed by Hillen et al. and van Vliet et al. [1,3].

The present study shows that the implementation of such expert opinion rounds can be beneficial: our procedures resulted in video-vignettes that were both deemed relevant and relatable by parents, clinicians, and researchers, without compromising the theoretical foundations and thereby internal validity of our study. In addition, through consulting experts in the design of our experimental vignettes, we helped to minimize our own biases, both in terms of our theoretical prepossessions as well as our personal experiences. Using the expert opinion rounds, our participants determined all our experimental manipulations, including argument quantity, content, salience, (un)reasonableness, and plausibility. In the present study, we specifically focused on verbal aspects of communication. However, non-verbal script manipulations (e.g., clinician eye gaze, set dressing) could be defined in a similar manner with the use of expert opinion rounds. Although previous studies have also included patients, clinicians and researchers to assess internal and external validity of written and role-played scripts [4–7,40], to the best of our knowledge this is the first study to include all these stakeholders' perspectives to create the experimental manipulations upfront. Thereby, the present study fits well with contemporary approaches to research that involve experience-based experts (e.g., clinicians, patients) throughout the research process to enhance study relevance as well as quality [22–25].

One of the advantages of using expert opinion rounds to design experimental manipulations is that study participants' engagement with the video-vignettes may be increased. This also applies to the design of video-vignettes that are used outside of research settings, for instance in medical teaching or practice. Engagement is a prerequisite when using video-vignettes [14,15]. It can be assumed that study participants will more easily relate to video-vignettes that closely resemble clinical reality. More so, the present study shows that the procedures for expert opinion rounds are highly feasible and can be conducted in a relatively short timeframe and at no additional cost. We conducted our expert opinion rounds over the course of four weeks and used freely available software to program the surveys. Therefore, we would recommend researchers – of course depending on the research question at hand – as well as other users to seriously consider the implementation of expert opinion rounds as good standard practice in the design of video-vignettes, to involve important stakeholders and, thereby, create video-vignettes that are unbiased, relatable, and realistic.

Of course, it should be noted that the described procedures solely focused on enhancing the ecological validity of our experimental video (scripts) and manipulations. That is, the goal was to improve study participants' ability to recognize the scripts as 'potentially real' dialogues. To enhance participants' ability to engage with video-vignettes and identify with the persons portrayed, also other, complementary methods should be considered. For example, it should be explored to what extent the use of *virtual and augmented reality* can help increase participants' engagement as compared to a traditional video-vignette (on a computer screen). As opposed to regular videos, VR and AR vignettes may help study participants to experience a conversation exactly how they would see it in real-life, allowing for full immersion. More so, these techniques can enable participants to interact with the experimental videos, if desired, much like in a regular conversation. The use of VR has been advocated previously by Visser et al. [41].

The present study also yielded several interesting, albeit exploratory, results regarding clinicians' argumentative practices in the context of treatment decision-making in neonatal care. Participants quite unanimously judged that a clinician, on average, should provide two good arguments to support a treatment decision. To the best of our knowledge, this is the first study to assess people's perceptions of the optimal number of arguments in a given context. While the number is surely context dependent, it nonetheless provides a sense of what relevant stakeholders deem acceptable decision-making practices. More so, in this study participants decided together on the 'best', most salient arguments for each of the four treatment decision-making scripts included.

Noticeably, participants were unanimous in their judgements. For each decision, our procedures yielded one reasonable, *symptomatic* argument (referring to a medical fact or symptom) and one reasonable, *causal (pragmatic)* argument (pointing out the positive consequences of the proposed treatment plan). This is in line with theoretical expectations concerning arguments and argumentative style in medical contexts [29–31]. This may be valuable information for clinical practice, as these are the arguments that our experts believe to be both medically appropriate and persuasive to parents. Although it should be borne in mind that effective arguments are always context-specific, similar procedures could be used to determine appropriate argumentative support for other common decision-making scenarios, even in other medical specialties. Also, future research should shed light on whether patients presented with appropriate argumentative support indeed experience their care plans as more sensible [42,43].

Noticeably, participants deemed the vast majority of arguments listed in Round 3 unreasonable, but also highly plausible. The fact that theoretically unreasonable arguments are indeed recognized, is in line with previous studies [27,38,44]. Yet, the present study suggests that participants also believe unreasonable argumentation to be a common practice in neonatal care. Some of our preliminary data provide suggestions that there may be differences between clinicians' and parents' judgements in that regard (with clinicians being slightly stricter in their unreasonableness judgments), however, our sample is too small to draw any conclusions. It would be worthwhile to further explore this. Regardless, our findings concerning the high plausibility of unreasonable argumentation in neonatal care practice provide food for thought.

This study has several strengths, including its systematic approach and the high involvement of parent representatives and clinicians – not only as study participants, but also as members of the research team. There are also some limitations. First, we used a Dutch convenience sample for our expert opinion rounds. As such, and in spite of our effort to invite a varied group of experts, we may have not heard from enough diverse viewpoints and some views may be culture or language specific. Also, participants presumably had a particular interest in medical communication. As a result, participants' comments on the scenarios were very detailed but also quite critical: comments often pertained to how clinicians should ideally communicate rather than how they actually do so in practice. Second, while expert opinion rounds are highly informative, still sometimes executive decisions had to be made by the research team, e.g., to adhere to medical guidelines, to align with argumentation theoretical principles, to maintain uniformity across experimental conditions, and to keep with the goal of the experiment. While this is not necessarily problematic, it should be borne in mind that not all suggestions made by participants in expert opinion rounds can be directly incorporated in the study design. Third, despite the best of our efforts in the present study, we will never be able to completely remove the 'artificial' aspect of video-vignette research. But we can make an effort to approximate the clinical reality of clinician-patient interaction as much as we can, within the boundaries of a laboratory experiment. The use of virtual reality may aid in this respect [41]. Nonetheless, as researchers, we should also continuously ask ourselves critically if perhaps the time has come – ethically and practically – to start running clinical trials in which we 'manipulate' clinicians' communicative behaviors in actual practice rather than in hypothetical and virtual contexts.

4.2. Conclusion

Expert opinion rounds offer an effective method to develop experimental manipulations for video-vignette research that are both theoretically valid (internal validity) and ecologically realistic (external validity). More so, they provide a powerful means to include clinicians, patients and their companions in research, also in the study design phase. Based on the expert opinion rounds described in the present paper, we yielded some preliminary insights into what is considered 'good' argumentative support for clinicians' treatment plans and into the plausibility of 'poor' argumentation in neonatal care. More so, our findings provide theoretical knowledge concerning typical argumentative practices in clinician-patient interactions. Yet, perhaps most importantly, these results warrant further investigations into the prevalence and consequences of clinicians' use of unreasonable argumentation in conversations with patients and companions.

4.3. Practice implications

The present study provides new, practical knowledge concerning the use of argumentation in four acute and non-acute treatment decision-making contexts in neonatal care. Also in the context of other treatment decisions, expert opinion rounds may be useful to determine which arguments clinicians and patients deem salient. Yet, most importantly, the presents study provides hands-on, stepwise guidelines on how to involve important stakeholders in the design of video-vignettes. These guidelines for expert involvement may be used for the development of experimental manipulations for video-vignette research, as we have done here. Yet, the guidelines can also be used for the design of other video-based health communication interventions, whether for use in research or implementation in clinical practice.

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CRediT authorship contribution statement

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

Competing interests

The authors declare to have no competing interests.

Appendix A. – Predefined unreasonable arguments

Initial list of unreasonable arguments (translated from Dutch) as defined by medical argumentation experts based on the pragma-dialectical argumentation theory [5,22,24,30–34]; empirical evidence concerning argument (un)reasonableness [23]; and observations in clinical practice [30–32]. The pragma-dialectical name of the unreasonable argument is listed in italics.

Treatment plan X is a good idea for your child, because….

1.	We have a lot of experience with it	*Ad verecundiam: authority argument*
2.	We actually always do it in this way	*Ad populum: argument by numbers*
3.	Personally, this seems best	*Evading the burden of proof: vouching personally*
4.	What alternative would you see?	*Shifting the burden of proof*
5.	This does not require an explanation	*Declaring the standpoint sacrosanct*
6.	This is actually all I will say about it now	*Declaring the standpoint sacrosanct*
7.	It is a reasonable plan	*Evading the burden of proof: presenting plan as self-evident*
8.	We know this is best	*Circular reasoning*
9.	I have a lot of expertise in this respect	*Ad verecundiam: authority argument*
10.	It is a logical step	*Evading the burden of proof: presenting plan as self-evid*
11.	What would you think is best?	*Shifting the burden of proof*
12.	It is actually self-evident	*Declaring the standpoint sacrosanct*
13.	In all other hospitals, we also do it in this way	*Ad populum: argument by numbers*
14.	Take it from me this is the best plan	*Evading the burden of proof: vouching personally*
15.	We should take good care of your child	*Circular reasoning*

Note that some of the unreasonable arguments that were finally selected were rephrased based on input from expert opinion Round 3.

Appendix B. - Camera perspective: stills from the video-vignettes

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1. “Put yourself in the shoes of the parents”

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2. Pediatrician-neonatologist and nurse

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3. Father and mother of the preterm infant

Appendix C. – Listed reasonable arguments per treatment decision (Round 1)

Note that the arguments below were listed by the participants in the expert opinion rounds, including parents, medical doctors, nurses, and researchers. As such, not all arguments are necessarily 'good' arguments from a clinical perspective or reasonable from an argumentation theoretical perspective. In selecting the final arguments, due attention was paid to clinical relevance and reasonableness.

Arguments are listed in random order.

Respiratory support: *My suggestion would be to decrease the level of respiratory support from CPAP to high flow, because: .*

1. Your child is doing better
2. The monitor shows your child has only few incidents
3. Your child's breathing is calm
4. Your child is ready to decrease respiratory support
5. High flow is milder than CPAP for your infant's lungs
6. The 'peep' (CPAP) was successfully decreased
7. High flow is more comfortable for your child than CPAP
8. The blood labs are good
9. Your child is growing
10. Your child tolerates caretaking procedures well
11. Your child is resisting CPAP
12. You, as parents, will be able to participate more in care
13. This is a usual step
14. It is justified
15. We can always go back to CPAP, if necessary
16. The system can then be disconnected for a while
17. Fewer alarms will sound
18. High flow reduces the risk of choking when breast or bottle feeding
19. Your child does not look tired
20. We can then see if your child can handle this

Nutrition: *My suggestion would be to increase the amount of nutrition from 20 to 23 ml per feeding, because:*

1. Your child is not growing enough
2. Your child poops well
3. Your child is growing well (NB. feeding goes per kg of body weight)
4. This is protocol
5. Your child needs more nutrition
6. Your child tolerates nutrition well
7. Your child has strengthened
8. We can then stop the nutritional drips faster
9. Increasing is important for growth and development
10. Your child doesn't spit
11. Fewer alarms will sound
12. Your child is ready

13. Your child's tummy is supple

Blood transfusion: *We just had to acutely give extra blood, because:*

1. We see from the blood values that the Hb decreases
2. A transfusion promotes recovery
3. It fits the protocol
4. Your child was suffering from oxygen deficiency
5. Your child showed signs of shock
6. Your child had too many dips (monitor incidents)
7. Your child stopped responding well
8. We saw that your child was tired
9. Your child was dazed
10. Your child's situation deteriorated
11. Iron supplementation alone is insufficient
12. Your child cannot keep up with his/her body growth
13. There was an acute hemorrhage
14. This is necessary for growth
15. Your child has a possible infection
16. Your child had a high heart rate
17. Sufficient red blood cells are essential for oxygen transport in the body
18. This is more common in premature babies
19. Your child is sick
20. A blood transfusion will give your child energy again
21. Your child does not produce enough blood itself

Lumbar puncture: We just had to acutely perform a lumbar puncture*, because:*

1. We think your child may have a (bacterial) infection
2. We think there may be sepsis
3. Your child became acutely ill
4. We want to investigate whether your child may have meningitis
5. Meningitis can affect your child's hearing
6. This fits within the protocol
7. So that we know, based on the results, how we can treat your child in a targeted manner
8. In this way we can determine which antibiotic to start
9. We always take blood, urine and cerebrospinal fluid when there is a suspicion of an infection
10. Premature babies have an increased risk of meningitis
11. Your child was aroused
12. We saw an increase in dips (incidents)
13. Acting fast was important
14. Blood inflammatory levels increased
15. We saw increased pressure on the ultrasound
16. Your child does not respond to (current) antibiotics

Appendix D. – Top 3 ranked arguments per treatment decision (Round 2)

In brackets the number of times an argument was selected in participants' top 5. In selecting the final arguments, due attention was paid to clinical relevance and reasonableness. Sometimes, arguments were slightly rephrased or merged for this purpose.

Respiratory support: *My suggestion would be to decrease the level of respiratory support from CPAP to high flow, because:* .

1. Your child is ready to decrease respiratory support (24x)
2. The monitor shows your child has only few incidents (18x)
3. High flow is more comfortable for your child than CPAP (16x)

Nutrition: *My suggestion would be to increase the amount of nutrition from 20 to 23 ml per feeding, because:*

1. Increasing is important for growth and development (26x)
2. Your child tolerates nutrition well (25x)
3. We can then stop the nutritional drips faster (21x)

Blood transfusion: *We just had to acutely give extra blood, because:*

1. We see from the blood values that the Hb decreases (20x)
2. Sufficient red blood cells are essential for oxygen transport in the body (19x)

3. A transfusion promotes recovery (15x)

Lumbar puncture: We just had to acutely perform a lumbar puncture*, because:*

1. So that we know, based on the results, how we can treat your child in a targeted manner (21x)
2. We want to investigate whether your child may have meningitis (20x)
3. Acting fast was important (17)

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