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**Development and refinement of Rel@x: A training in hypnosis-derived communication for pediatric nurses to prevent procedural pain**

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## 1 Abstract

2       **Introduction:** Studies in pediatric oncology have shown that hypnosis effectively reduces  
3 patients' pain and distress during painful procedures. This remains underutilized in the healthcare  
4 system due to the staff cost and availability of hypnotherapists. To develop the use of hypnosis-  
5 derived communication, we aimed to train nurses to use hypnosis-derived communication while  
6 they perform painful procedures. **Objectives:** This study aimed to (1) develop a brief training in  
7 hypnosis-derived communication for pediatric nurses named *Rel@x*, (2) pretest the training with  
8 experienced pediatric oncology nurses and (3) refine the training based on nurses' suggestions.  
9 **Methods:** The *Rel@x* training consists of two 4-hour sessions: one related to relational aspects  
10 and another one presenting one of two selected hypnotic communication techniques ("pleasant  
11 place" or "magic glove"). *Rel@x* makes use of manuals, cue card reminders, visual aids, videos  
12 and an e-learning platform. To refine *Rel@x*, a complete training cycle was conducted with seven  
13 female pediatric oncology nurses. A mixed method study with an evaluation questionnaire and a  
14 post-training focus group interview was conducted. **Results:** Quantitative data showed that nurses  
15 overall positively rated the training program: relevance and acceptability (median average of  
16 5.4/6); use of hypnotic communication (median average of 5.2/6); expected effects (median  
17 average of 5.4/6); program implementation (5.6/6). Two general themes emerged from the  
18 qualitative data: perceptions of hypnotic communication and the evaluation of the *Rel@x* training  
19 program. Based on nurses' suggestions, *Rel@x* was refined by adding more practical components,  
20 more time for practice, more time between the two sessions and additional tools (cue card  
21 reminders, keywords, virtual e-learning recap module). **Conclusion and clinical implications:**  
22 The use of hypnosis-derived communication during painful procedures and the *Rel@x* training  
23 were viewed favourably amongst pediatric nurses. *Rel@x* offers a complete training in hypnosis-  
24 derived communication for pediatric nurses. This training fosters the optimal use of hypnosis-  
25 derived communication during care and may significantly reduce children's procedural pain and  
26 distress.

27  
28 **Keywords:** Procedural pain, Distress, Pediatrics, Hypnosis-derived communication, Cancer

## 29 **1. Introduction**

30 Whether for undergoing medical diagnostic tests or for receiving treatment, children with  
31 chronic conditions undergo numerous procedures associated with significant levels of pain and  
32 distress.<sup>1</sup> Previous negative and painful medical experiences can greatly affect how children  
33 experience subsequent procedures<sup>2</sup>, sometimes leading to important fears and avoidance<sup>3</sup>. In  
34 oncology, past experiences may also lead to pediatric medical traumatic stress.<sup>4,5</sup> Procedural pain  
35 and distress management is thus of utmost importance in pediatric healthcare settings.

36 In pediatrics, a combination of pharmacological and non-pharmacological (i.e.  
37 psychological and physical) interventions now allows for effective procedural pain management.<sup>6,7</sup>  
38 Although pharmacological interventions are usually effective, they are sometimes associated with  
39 side effects, limitations, contra-indications and cautions.<sup>6</sup> This is why refined non-  
40 pharmacological approaches are needed. These include various types of interventions, such as  
41 distraction techniques or tools, and even virtual reality.<sup>8-10</sup> Some non-pharmacological  
42 interventions require expensive technology needing updates or have a limited duration of use.

43 Among empirically supported non-pharmacological interventions, hypnosis and hypnosis-  
44 derived communication can relieve children's physical and psychological discomfort.<sup>11</sup> Based on  
45 a therapist's suggestions for change, hypnosis can lead to changes in a patient's sensation,  
46 perception, cognition, affect, mood or behaviour.<sup>12</sup> Hypnosis-derived communication consists of  
47 using communication techniques derived from clinical and medical hypnosis without inducing an  
48 altered state of consciousness in the patient like formal hypnosis.<sup>13</sup> Hypnosis and hypnosis-derived  
49 communication mainly rely on the child's imagination and the healthcare professional's adapted  
50 language without requiring any additional support materials. This makes them applicable in a wide  
51 range of settings and unplanned situations (e.g., emergency units).

52 Previous studies in pediatric oncology have shown that hypnosis and hypnosis-derived  
53 communication are effective in reducing young patients' pain<sup>14-25</sup>, distress<sup>14, 17-22, 25</sup>, anxiety<sup>14, 15,</sup>  
54 <sup>17-22, 24, 26</sup> and fear<sup>16</sup> during painful medical procedures. Typically, these were small-medium scale  
55 quantitative studies (n=18-80, with or without control groups). These were limited as they did not  
56 provide a formal evaluation (i.e., standardized tool) of behaviours and skills demonstrated by  
57 professionals. Additionally, hypnosis and hypnosis-derived communication have been used in  
58 different medical settings in pediatrics as well as during various medical procedures: burn care  
59 procedures<sup>27</sup>, transesophageal echocardiography<sup>28</sup>, noninvasive positive pressure ventilation<sup>29</sup>.  
60 Interestingly, they were beneficial to both the patients<sup>27, 29</sup> and the procedure routine (e.g., time  
61 and anesthesia)<sup>28, 29</sup>.

62 Most studies in pediatrics involve two professionals, with a professional providing the  
63 "hypnosis talk" while a healthcare professional performs the procedure. For organizational  
64 reasons, this is not easily implemented in pediatrics and is not feasible as the system lacks highly  
65 trained professionals to provide the "hypnosis talk". As nurses have a variety of important roles,  
66 including providing care and acting as a resource for their young patients and families, it would be  
67 highly beneficial if nurses could implement simple hypnotic communication techniques while  
68 performing medical procedures.

69 A previous feasibility study showed that, following a brief twenty-hour training, pediatric  
70 nurses developed a good mastery of hypnosis-derived communication.<sup>30</sup> Interestingly, another  
71 analysis showed that these communication behaviours were associated with a decrease in patients'  
72 pain and distress.<sup>25</sup> The results were promising but the satisfaction study conducted with the nurses  
73 who participated in the hypnotic communication training also stressed the need for changes in the

74 content (e.g., learning only one or two techniques) and format (e.g., shorter training with role-  
75 playing and videos).<sup>30</sup>

76 Based on this experience, we wished to simplify and refocus this training. We developed a  
77 preliminary version of *Rel@x* and led a refining study, in line with current guidelines in program  
78 development.<sup>31</sup> Our specific aims were: (1) to develop a focused and shorter training in hypnosis-  
79 derived communication for pediatric nurses; (2) to pretest the training in hypnosis-derived  
80 communication with experienced pediatric oncology nurses; (3) to refine the training based on a  
81 systematic collection of nurses' suggestions.

## 82 **2. Methods**

83 The study was conducted at Sainte-Justine University Hospital Centre (Sainte-Justine  
84 UHC) in Montreal, Quebec, Canada. Ethical approval (#2019-2205) was obtained from the Sainte-  
85 Justine UHC Research Ethics Committee. All participants provided written informed consent.

86

### 87 ***2.1 Training development: Rel@x***

88 The *Rel@x* training program was designed to train hypnotic communication skills to be  
89 directly applicable to nurses' daily practice. The training was adapted from the one previously  
90 studied by our research team<sup>25, 30, 32, 33</sup>. It was developed from the literature on clinical hypnosis: a  
91 book on the practice of hypnosis in pediatrics<sup>34</sup> and a guide on hypnotic metaphors and  
92 suggestions<sup>35</sup>. Key concepts were selected by the research team with a special input by the second  
93 author (DO, psychologist and hypnotherapist, member of the Quebec Hypnosis Society).

94 In order to offer the same content uniformly across all trainees, to promote the training  
95 systematization and to allow its subsequent dissemination, the program was manualized (current  
96 manuals available here: <http://hdl.handle.net/1866/25349>). The *Rel@x* training consists of two

97 parts: one related to relational aspects and another one presenting two selected hypnotic  
98 communication techniques whose efficacy is supported by the evidence (“pleasant place” or  
99 “magic glove”)<sup>34,36</sup>. In its current version, participants may choose one of the two techniques they  
100 wish to be trained in first and -pending on organizational and budget constraints- they may follow  
101 an additional module to learn the second technique. The training is highly interactive and calls for  
102 role-play as well as viewing and criticizing videos. The training includes two 4-hour sessions: one  
103 session on the introduction to hypnotic communication and the relational aspects, and one  
104 specialized session on the chosen technique. If a second technique is taught, this adds 4 hours, i.e.,  
105 a 12-hour training globally. For this refinement study, in order to collect feedback on the whole  
106 training material, we offered training in both techniques (“pleasant place” and “magic glove”) to  
107 the group and thus added one additional session (12 hours in total, see Figure 1).

108  
109 **Figure 1.** Rel@x training program: hypnotic communication techniques training sessions content

110  
111  
112 The relational session is theoretical and practical. Its objectives are to familiarize  
113 participants with the definition of hypnotic communication, the notion of synchronization,  
114 reframing techniques as well as direct and metaphorical suggestions derived from clinical hypnosis  
115 (see Appendix of the previous report<sup>32</sup>). At the end of the session, two techniques are presented:  
116 (1) the “pleasant place”, which consists of suggesting that the child visit a pleasant place using his  
117 or her five senses and imagination<sup>34</sup> and (2) the “magic glove”, which consists of suggesting to the  
118 child that his or her arm is being protected by an imaginary protection<sup>34,37</sup>.

119 The first relational part of the training is a prerequisite for the technical part which has two  
120 main learning objectives: learning simple language derived from clinical hypnosis and learning

121 how to detect cues of the desired effects in the patient. The second technical part allows for the  
122 learning of the techniques' scenarios and their application in daily practice.

123 *Rel@x* uses tools and videos: (1) manuals, (2) cue card reminders, (3) visual aids  
124 (*PowerPoint*) and (4) videos illustrating how both hypnotic communication techniques are used  
125 by nurses in practice. At the end of the training, it is possible for participants to view a synthesized  
126 version online via an e-learning platform available through our healthcare centre  
127 ([https://enseignement.chusj.org/fr/Formation-continue/Autoformations-\(e-Learning\)/Liste-des-](https://enseignement.chusj.org/fr/Formation-continue/Autoformations-(e-Learning)/Liste-des-cours-offerts/Rel@x)  
128 [cours-offerts/Rel@x](https://enseignement.chusj.org/fr/Formation-continue/Autoformations-(e-Learning)/Liste-des-cours-offerts/Rel@x)).

129 Two trainers are necessary to ease with role-play and practical exercises. Both trainers hold  
130 a background in psychology, the senior is a psychologist and hypnotherapist (DO) while the junior  
131 is a doctoral graduate student trained in clinical and medical hypnosis (JA).

132

## 133 ***2.2 Training pretest and improvement***

134 To refine *Rel@x*, we conducted a complete training cycle with voluntary experienced  
135 nurses from Sainte-Justine UHC's pediatric Hematology-Oncology Department.

136

### 137 ***2.2.1 Participants***

138 The study protocol and the training program were presented during a meeting between the  
139 research team and Sainte-Justine UHC's Hematology-Oncology Department nursing staff  
140 supervisors. Following this meeting, the supervisors informed the nursing staff of the opportunity  
141 to receive a training in hypnotic communication to develop their skills to reduce their patient's pain  
142 and distress. Seven nurses volunteered to take part in this refinement study. To participate in the  
143 study, nurses had to: (1) have routine clinical activity involving venipuncture with children, and  
144 (2) have no prior training in hypnosis or hypnosis-derived communication.



145

### 146 **2.2.2 Procedure**

147         This study design is a mixed method based on an evaluation questionnaire and a post-  
148 training focus group interview to assess the acceptability and satisfaction of the training for  
149 pediatric nurses. Firstly, nurses took part in the training sessions which occurred in July 2019  
150 (relations aspects and pleasant place technique) and February 2020 (magic glove technique). Seven  
151 (7) nurses completed the relational session. Two of them were not available to complete all of the  
152 training sessions due to work schedules. Six (6) participated in the “pleasant place” training session  
153 and five (5) completed the “magic glove” session.

154         The 5 nurses who completed all the sessions were invited to respond to an evaluation  
155 questionnaire. They were also invited to take part in a one-hour semi-structured focus group  
156 interview to collect their feedback on the training content, format and materials as well as their  
157 suggestions for improvement. The focus group was audio-recorded and fully transcribed for further  
158 analysis.

159

### 160 **2.2.3 Measures**

161         *Evaluation questionnaire:* We collected participants’ age, level of education, number of  
162 years of clinical experience, number of years of clinical experience in pediatrics, and professional  
163 curriculum. To evaluate the training program, the research team developed a questionnaire adapted  
164 from previous studies<sup>38</sup> (see Supplementary File 1). This 16-item questionnaire explored 4  
165 domains: relevance and acceptability (5 questions), use of hypnotic communication (5 questions),  
166 expected effects (5 questions) and suitability for implementation in hospital settings (1 question).

167 Responses were provided on a 6-level scale: "1" strongly disagree and "6" strongly agree. Space  
168 was also available after each category to allow nurses to provide additional comments.

169 *Focus group interview:* At the end of the study, a semi-structured focus group interview  
170 was conducted with the nurses to discuss the seven following topics: (1) their motivation to  
171 participate in the training, (2) the use of hypnotic communication, (3) their perceived personal  
172 benefits, (4) the training program's relevance and acceptability, (5) their training satisfaction and  
173 training assessment (positive and negative aspects), (6) their suggestions for improvement  
174 (content, format, materials) as well as (7) the integration of hypnotic communication in hospitals.

### 175 **2.2.3 Analyses**

176 Quantitative data were analyzed using descriptive statistics in *IBM SPSS Statistics 26*. For  
177 the qualitative data from open-ended questions (*evaluation questionnaire*) and the focus group, we  
178 used emergent thematic analyses. The first two authors followed these steps: (1) transcript coding  
179 by two authors separately (JA, DO), (2) first meeting to discuss the list of themes and reach a  
180 consensus on themes selection and description, (3) transcript recoding based on this consensus and  
181 (4) second meeting to discuss themes and reach the final coding structure. For the sake of brevity,  
182 we will use quotes when they add to the understanding of themes. When presenting the results,  
183 participants will be identified using alphanumeric codes (N1 to N7).

## 184 **3. Results**

185

### 186 **3.1 Participants**

187           The five nurses who followed the whole program all had a bachelor’s degree in nursing  
188 and, on average, were  $27.2 \pm 1.3$  years old and had  $5.9 \pm 2.3$  years of clinical experience (all in  
189 pediatrics). Two nurses (N3 and N5) were unable to complete the whole program.

190

### 191 ***3.2 Quantitative data***

192           In regards to the training program evaluation questionnaire, ratings were overall positive.  
193 Items pertaining to relevance and acceptability were rated positively (median average of 5.4/6),  
194 although they found the manuals to be moderately easy to use (4.2). In general, nurses positively  
195 rated the use of hypnotic communication (median average of 5.2), even though they moderately  
196 agreed that the intervention would be simple to use in their daily practice (4.2) and that it is easily  
197 integrated for a layperson (4.0). Nurses also positively evaluated the expected effects for patients  
198 (median average of 5.4), though they moderately agreed that hypnotic communication allows for  
199 a better control of their own emotions during procedures (4.4). Finally, nurses thought it would be  
200 beneficial to extend this practice in a hospital setting (5.6) (Table 1). Although these results are  
201 encouraging, we found far more detailed information for future refinements in the qualitative data.

202

203           ***Table 1.*** Average score of nurses’ responses to the Rel@x training program evaluation  
204 questionnaire (5 nurses participated in the entire pre-test)  
205

### 206 ***3.3 Qualitative data***

207           The qualitative data presented below stem from the focus group conducted with the nurses  
208 and their written comments in the evaluation questionnaire. Two central themes emerged from the  
209 focus group’s verbal material and the open-ended commentaries section: perceptions of hypnotic  
210 communication and evaluation of the Rel@x training program. The verbatims reported in the

211 following lines are all from the focus group. Full thematic trees from the emergent thematic  
212 analysis are available in Figure 2.

213

214 **Figure 2a.** Theme 1: Perceptions of hypnotic communication

215 **Figure 2b.** Theme 2: Evaluation of the Rel@x training program

216

### 217 **3.3.1 Perceptions of hypnotic communication**

218

#### 219 *3.3.1.1 Perceived benefits and inconveniences for patients*

220 Nurses reported several benefits for patients but did not mention any inconvenience. In  
221 general, they believed that hypnotic communication would provide an alternative to the  
222 medications, which they said they frequently use in their practice, and be beneficial for patients  
223 and their families (e.g., brings calmness to the patient, beneficial for patients' quality of life,  
224 improves parents' experience, etc.). Participants mentioned that this style of communication would  
225 allow patients to relax, and that this could help reduce their pain. Additionally, nurses mentioned  
226 that hypnotic communication could improve patients' anxiety at different levels, including direct  
227 anxiety, anticipatory anxiety, and traumatic anxiety. Some nurses also expressed that hypnotic  
228 communication allows for the child's creativity.

229 "I think it will have benefits other than pain because by doing this with the patients you  
230 will bring them to be able to be mindful and then they will be able to become fully aware, they  
231 will be happier in their life and more positive." (N2, focus group)

232

#### 233 *3.3.1.2 Perceived benefits and inconveniences for nurses*

234 In general, nurses noted several benefits for themselves. They highlighted multiple positive  
235 changes in their nursing practice such as having an additional tool that allows for the management

236 of patients' procedural pain and distress, more reflection, changes in the words used with patients:  
237 “I am more careful with my words...not to use negative words” (N7, focus group). Nurses also  
238 expressed several additional benefits for the nursing personnel. Some nurses mentioned that  
239 hypnotic communication allows for the management of their own anxiety since they used hypnotic  
240 techniques, such as breathing techniques, for themselves. Hypnotic communication also allowed  
241 some nurses to develop their patience and improve the collaboration with the patient. Some  
242 participants reported that hypnotic communication broke the existence of this nurse-patient  
243 repetitive routine since the training allowed them to become aware of the fact that they have a  
244 routine that tends to trivialize certain medical acts that may in fact be traumatic for young patients.  
245 Nurses mentioned that telling stories as part of the hypnotic techniques had an impact on their own  
246 personal well-being. They expressed that with hypnotic communication, they felt that they could  
247 play at work, despite the oncology setting. The use of hypnotic communication allowed their work  
248 to be more enjoyable: “when we bring our patients into the imaginary, we often have better days...”  
249 (N1, focus group). In contrast, one participant did not notice any difference in herself, and another  
250 mentioned an inconvenience regarding the anxiety-provoking effect she felt during role-plays.

251

### 252 *3.3.1.3 Use of hypnotic communication in nursing practice*

253 Overall, nurses reported that such communication practice will be pertinent, and beneficial  
254 for patients. Some mentioned the effect would primarily be on anxiety or anticipatory anxiety.  
255 They mentioned that all nurses in hematology-oncology should be trained to uniformly support  
256 patients. The idea to train all healthcare professionals and expand this practice in other pediatric  
257 settings was also mentioned in the focus group. They underlined the impact of this form of  
258 communication on their work experience. Hypnotic communication was described as enjoyable,

259 feasible (although it could be time-consuming at times), simple to use and easy to integrate in  
260 one's practice. They underlined the pleasure of learning relational aspects. Interestingly, some  
261 nurses realized after the training that they had naturally been using some similar techniques. Nurses  
262 also expressed that it seemed feasible to perform a procedure alone while using hypnotic  
263 communication techniques, and that they would feel comfortable doing so in their future practice.  
264 Participants mentioned that, before the training, there were disagreements in the group about the  
265 magic glove's efficacy. Following the training sessions, they reported that the magic glove would  
266 be faster and easier to master than the pleasant place. Nurses also agreed that using hypnotic  
267 communication would require a high level of technical skills so that the nurse's attention could be  
268 primarily focused on communication and not on the technical aspects of the care. Though, they  
269 reported it would be positive to expose young nurses even though they may have difficulties using  
270 these communication techniques. Reservations expressed by participants dealt with the fact that  
271 they needed practice to integrate this form of communication in their toolbox and that some  
272 participants were not convinced it could be used when performing complex procedures that require  
273 all their attention, especially if the child is young. In these complex situations, two nurses could  
274 be required, one providing the hypnotic communication talk while the other would perform the  
275 technical procedure. Nurses also expressed having difficulty assessing the unique effect of  
276 hypnosis-derived communication on children's pain as compared to anxiety or other aspects.

277 "I think that the rest of the team really needs to be sensitized... (...) we're like eighty nurses  
278 in hematology-oncology. We're seven trained nurses (...) it's all good if we do it, but the rest of  
279 the time when it's other practitioners who do the interventions and who don't have these tools, I  
280 think it can remain (...), if we do it and the next time it's someone else who doesn't have the tools  
281 to reuse the technique, it's going to be traumatic again." (N1, focus group)

282

283 **3.3.2 Evaluation of the Rel@x training program**

284

285 **3.3.2.1 *Positive perceptions***

286 Overall, nurses were satisfied with the training that met their expectations. They specified  
287 that both hypnotic techniques they learned were important, and felt that the magic glove was more  
288 adapted for their younger patients. Importantly, they mentioned they would not need additional  
289 training sessions but would be happy staying in contact with the trainers to get some quick support  
290 if needed. They judged the training as adequate for training pediatric nurses in hypnotic  
291 communication. Participants reported that the training had enough theoretical elements and that  
292 examples were essential, as were role-play and live practising. They felt that trying the hypnotic  
293 communication techniques allowed them to be more receptive. Participants also expressed a  
294 preference for live interactions and exercises during the training sessions. They were satisfied with  
295 the progressive nature of the training since it allowed them to break down the techniques. The  
296 training format introducing relational principles before techniques that took place in distinct  
297 sessions was also positively judged. They globally found the number of sessions was sufficient  
298 and appreciated that the training would take place over separate days (at least 2) as this allowed to  
299 practise between sessions. Both techniques were also evaluated as useful and complementary.  
300 They found the tools simple, useful, and pertinent, specifically the paper manual and the video  
301 recordings. Finally, nurses also raised several elements related to the practical aspects of the  
302 training, appreciating working in a small group in a supportive non-judgmental environment. They  
303 specified that a maximum of 7 to 10 participants would be adequate for future sessions.

304 “I think it was facilitating. That allowed us to like...take the time to listen to others how  
305 they were doing, take the time (...) with you, interact and see what we were doing right and what  
306 we were doing wrong versus if we had been a bigger class, I think we would have had less time to  
307 take that kind of attention (...).” (N1, focus group)

308

### 309 3.3.2.2 *Negative perceptions*

310 As for the content of the training, several nurses found that the pleasant place technique  
311 took too much time to be easily implemented in practice and that it could be difficult to feed the  
312 imaginary process. Some participants found that suggested written scenarios were a bit long, and  
313 that some videos were not fully realistic (indeed some videos used for training involved actors).  
314 Nurses also expressed that the manuals were not the training’s most significant aspect. Finally,  
315 some participants reported they found little use for the manual itself and the suggested verbal  
316 scenarios, recognizing these could be useful to others though.

317 “I am a person who has imagination in life, but there comes a time when in the pleasant  
318 place there was nothing that came to my mind!” (N2, focus group)

319

### 320 3.3.2.3 *Suggestions for improvement*

321 When asked about improvements for the *Rel@x* training, nurses suggested a series of  
322 measures. A table summarizes their suggestions for improvement and the subsequent  
323 modifications made to the training. In rare cases the research team decided not to follow these  
324 suggestions (Table 2).

325

326 **Table 2.** Nurses’ suggestions for the *Rel@x* training program’s improvement

327



328           In summary, participants expressed the need for cue card reminders in a small format to  
329 help them when they are at their patients' bedside. For some, this could even replace the paper  
330 manuals. The nurses also insisted on having keywords attached to or replacing the verbal scenarios,  
331 as these may be easier to integrate, and perhaps include words and suggestions to use and others  
332 to avoid. All participants also wished the training to have even more role-plays, demonstrations,  
333 and exercises, and some involving the two trainers, as these would be more engaging and give  
334 them ideas on how to proceed with the use of the techniques. They wished to have some kind of  
335 supervision when implementing the techniques with patients. They also suggested rearranging  
336 when and how the videos are used. These should be discussed after a technical presentation and  
337 be sectioned by steps. They also suggested that videos should exemplify real interactions and that  
338 they could participate in building additional training material involving nurse-patient interactions.  
339 As for the existing videos, nurses suggested that the camera should zoom in when the professional  
340 puts the magic glove on the child's arm. Suggestions were also made on having more time between  
341 sessions on relational aspects and the hypnotic technique (2 to 4 weeks ideally) to offer more  
342 opportunities to practise the relational principles. Finally, some nurses suggested that the training  
343 should provide counter-examples: “(...)...it could even include counter-examples (...) you see in  
344 this situation it didn't work. (...)” (N4, focus group).

345           Following these suggestions, a series of changes were made to the training to improve its  
346 pertinence, acceptability, and use in practice. In summary, we decided to add more practical  
347 components to the training program (e.g., exercises, examples, role-plays, etc.) as well as dedicate  
348 more time for practice. We also provided additional tools to participants (cue card reminders,  
349 keywords, virtual e-learning recap module) and more time was added between relational and  
350 technical sessions (at least two weeks).

351 This led to the revised version of the *Rel@x* training being currently pilot-tested in our  
352 centre. The training manual (French and English versions) and additional supporting material are  
353 available here: <http://hdl.handle.net/1866/25349>.

354 When comparing results from the quantitative and qualitative data, we observed that some  
355 quantitative low scores are now explained by concrete constructive criticism. For example, nurses'  
356 assessment of the manuals' ease of use can be explained by the fact that some nurses found little  
357 use for the manuals themselves and their content (i.e., the suggested verbal scenarios). Also, nurses  
358 moderately agreed that hypnotic communication was simple to use and easily integrated for a  
359 layperson. This can be explained by the fact that nurses mentioned that the pleasant place technique  
360 was somewhat complex to integrate in their clinical practice. Additionally, nurses moderately  
361 agreed that hypnotic communication benefits them when performing medical procedures. This can  
362 be explained by the fact that some nurses mentioned benefits while others did not.

363

#### 364 **4. Discussion**

365

366 This study aimed to develop a preliminary version of *Rel@x*, a training in hypnosis-derived  
367 communication for pediatric nurses to prevent children's procedural pain and distress as well as  
368 lead a refining study. Specifically, this study aimed to develop a brief training in hypnosis-derived  
369 communication for pediatric nurses, to pretest the training with experienced pediatric oncology  
370 nurses and refine the training based on nurses' suggestions.

371 Regarding the development of *Rel@x*, the training focuses on relational aspects and two  
372 hypnotic communication techniques. We refined the training through quantitative and qualitative  
373 evaluations that led to changes based on nurses' suggestions. The final version of *Rel@x* resulting

374 from this study is thus a collaborative effort between our research team and the end-users.  
375 Additionally, the training is rather inexpensive being a group training, and relying on an e-learning  
376 module: costs are limited to the teaching staff (one hypnotherapist and one assistant) and time  
377 compensation of participants.

378 As in our feasibility study<sup>30</sup>, nurses generally rated the training positively. This similarity  
379 between our two studies may be explained by participating nurses' openness to using non-  
380 pharmacological interventions and their desire to develop new skills in pediatric procedural pain  
381 management.

382 The focus group and the open-ended questions shed light on nurses' perceptions of  
383 hypnosis-derived communication. Regarding the perceived benefits and inconveniences for  
384 patients, nurses felt that patients could only benefit from the use of this non-pharmacological  
385 intervention, which is consistent with the fact that findings on adverse effects related to hypnotic  
386 interventions for pediatric procedural pain management are rare.<sup>39, 40</sup> In line with the literature on  
387 the use of hypnosis with children<sup>34, 35</sup>, our study also shows that nurses noticed that this non-  
388 pharmacological intervention is beneficial for the parents of sick children. Seeing their children  
389 undergo painful procedures can be difficult for parents and affect their ability to support and  
390 protect them.<sup>41</sup> It is also possible that the nurses' previous experience when caring for sick children  
391 and their families raised the need to use such pain-targeted interventions that can address both  
392 children's pain and parents' experience.

393 Regarding the perceived benefits and inconveniences for nurses, the focus group  
394 highlighted several changes in the nursing practice, such as the addition of a tool for pain and  
395 distress management and the development of communication competencies (e.g., changes in the  
396 words used, use of positive words). Our study showed that hypnosis-derived communication also

397 could benefit nurses' quality of life at work and their well-being, as our participants reported  
398 several additional benefits for themselves. Working in pediatric oncology can be challenging for  
399 nurses as they are exposed to many stressors<sup>42</sup> and are at risk of suffering from various  
400 psychological disorders such as compassion fatigue and burnout<sup>43</sup>. It would appear that the use of  
401 hypnosis-derived communication in their clinical practice has the potential to improve their quality  
402 of life at work. This result was found in anesthesia departments, where healthcare professionals  
403 practising hypnosis were shown to be less prone to suffer from burnout.<sup>44</sup> It would be interesting  
404 for future studies to explore the impact of using hypnosis-derived communication on pediatric  
405 nurses' mental health.

406 In regards to the use of hypnosis-derived communication, participants reported that this  
407 intervention is simple to use, enjoyable, feasible, easily integrated (especially the magic glove)  
408 and that they would be comfortable using it in their practice. Other research teams have studied  
409 the successful implementation of physician and nurse-led complementary and alternative  
410 medicine, such as hypnosis, in pediatric healthcare settings.<sup>45</sup> For several years, some authors have  
411 believed that hypnotic interventions should be used by all nurses<sup>46,47</sup> and that if these interventions  
412 were medications, they would be part of the standard care<sup>48</sup>. Our focus group revealed that nurses  
413 also shared this perception and believed that all healthcare professionals should use hypnotic  
414 communication in their practice.

415 Participants' feedback is crucial when developing new non-pharmacological interventions.<sup>31</sup>  
416 The focus group showed that nurses were satisfied with the training and that it was adequate for  
417 training pediatric nurses. Participants mentioned that they appreciated all the practical components  
418 (e.g., examples, role-plays, live practising) and the progressive learning as well as having the  
419 opportunity to learn both techniques. Considering that nursing students and licensed nurses learn

420 effectively by engaging in simulations<sup>49</sup>, it is very likely that this type of training, is adapted to  
421 nurses' needs and learning styles, as it allows both to visualize and to practice these techniques  
422 among colleagues. Role-playing is a commonly used strategy in nursing and healthcare  
423 education.<sup>50, 51</sup> However, nurses expressed that the pleasant place technique was more complex to  
424 use (e.g., took too much time and imagination) and mentioned that some tools were less adapted  
425 (e.g., scenarios were too long, unrealistic videos). It is possible that nurses' professional experience  
426 had an influence on their perception of the pleasant place technique. As pediatric nurses, they have  
427 to take on multiple roles challenging their attentional capacities<sup>52</sup> and they may prefer quicker and  
428 easier techniques.

429         An important aspect that emerged from the focus group and the open-ended questions were  
430 the suggestions for improvement, particularly in terms of practical aspects, the materials used and  
431 the time allocated between the different sessions. On the one hand, the suggestions for  
432 improvement showed the nurses' interest in wishing to master the hypnotic skills by suggesting  
433 adding more practical components and time between sessions to allow for practice. On the other  
434 hand, it also may underline the need to adapt the materials so that nurses can master the techniques  
435 in their own way. Using keywords or cue card reminders rather than a pre-set scenario allows  
436 nurses to make the hypnotic techniques their own and, more importantly, to be able to adapt these  
437 techniques to each patient easily and quickly.

438         Some limitations must be recognized and considered when interpreting the results. First,  
439 the sample was limited. We recognize that refining such complex training is an ongoing process.  
440 It is possible that a larger sample size might have revealed complementary perceptions of the  
441 training and additional suggestions for improvement. We aimed to reproduce the actual context of  
442 the training sessions in order to obtain their evaluation on the program as it would be taught.

443 Furthermore, this study was conducted in a single site based in a French-speaking province of  
444 Canada as well as in a single department. The evaluation and suggestions for improvement may  
445 differ from one hospital to another as well as from one department to another. Future studies should  
446 address these gaps by collecting feedback in other settings. Current pilot data are being collected  
447 in other settings than oncology in our centre (emergency wards, general pediatrics).

448

## 449 **5. Conclusion**

450

451 In conclusion, we developed a manualized training named *Rel@x* in hypnosis-derived  
452 communication for pediatric nurses to manage children's pain and distress during painful medical  
453 procedures. We pre-tested the training with a group of nurses and collected their feedback. They  
454 globally reported positive experiences and judged the training as pertinent and acceptable. They  
455 suggested improvements for future versions. Based on their suggestions we developed the current  
456 version of *Rel@x* incorporating more exercises and role play, making available cue card reminders,  
457 and offering an e-learning program to support skill retention. The current version of *Rel@x* is  
458 currently being pilot-tested in our pediatric centre aiming at assessing trainability, determining the  
459 size of outcomes following training, and build intervention capacity for future efficacy trials. To  
460 further evaluate this training and study its effects, we will need to build capacity in several  
461 departments and across institutions. We plan to offer the revised training in a number of partnering  
462 institutions as part of this evaluation process.

463

## 464 **Acknowledgments**

465           The authors wish to thank all the nurses who took part in this study and helped improve  
466 the *Rel@x* training program as well as the authors and nurses who participated in the previous  
467 feasibility study.

468

469   **Declaration of interests**

470           The authors declare no conflict of interests.

471

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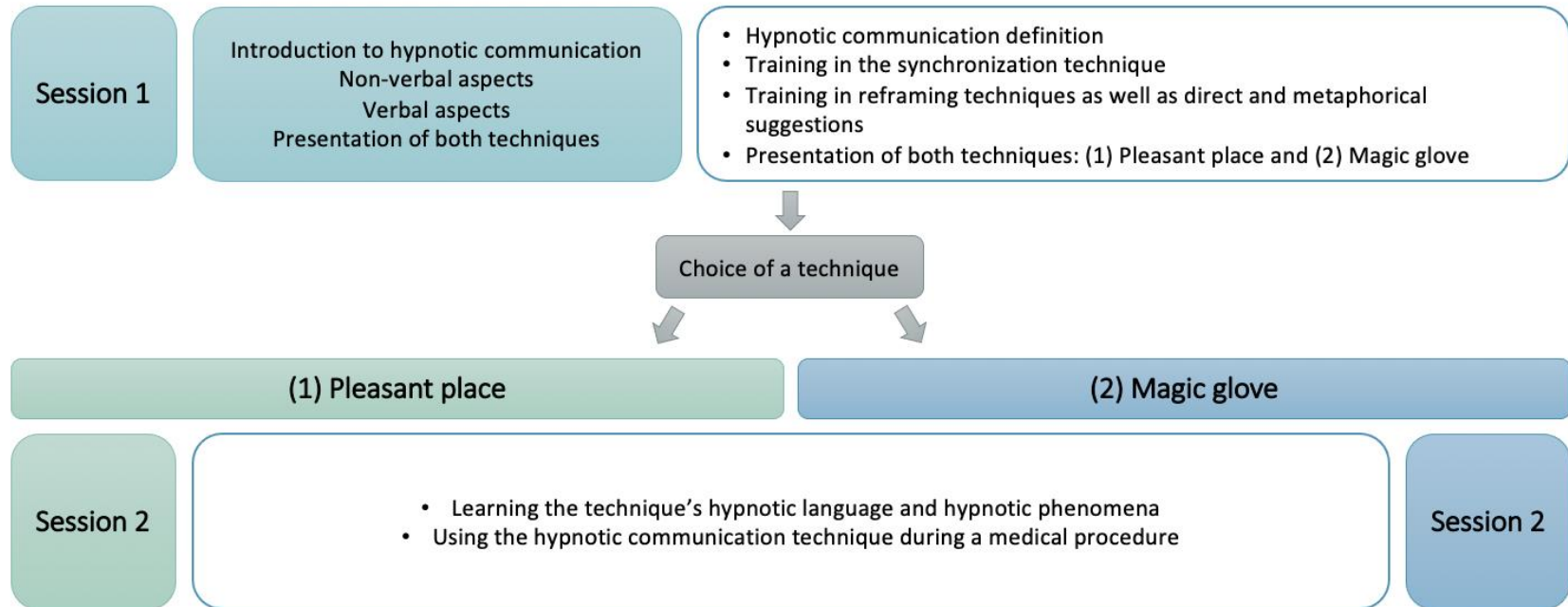
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**Figure 1.** Rel@x training program: hypnotic communication techniques training sessions content



**Table 1.** Average score of nurses' responses to the Rel@x training program evaluation questionnaire (5 nurses participated in the entire pre-test)

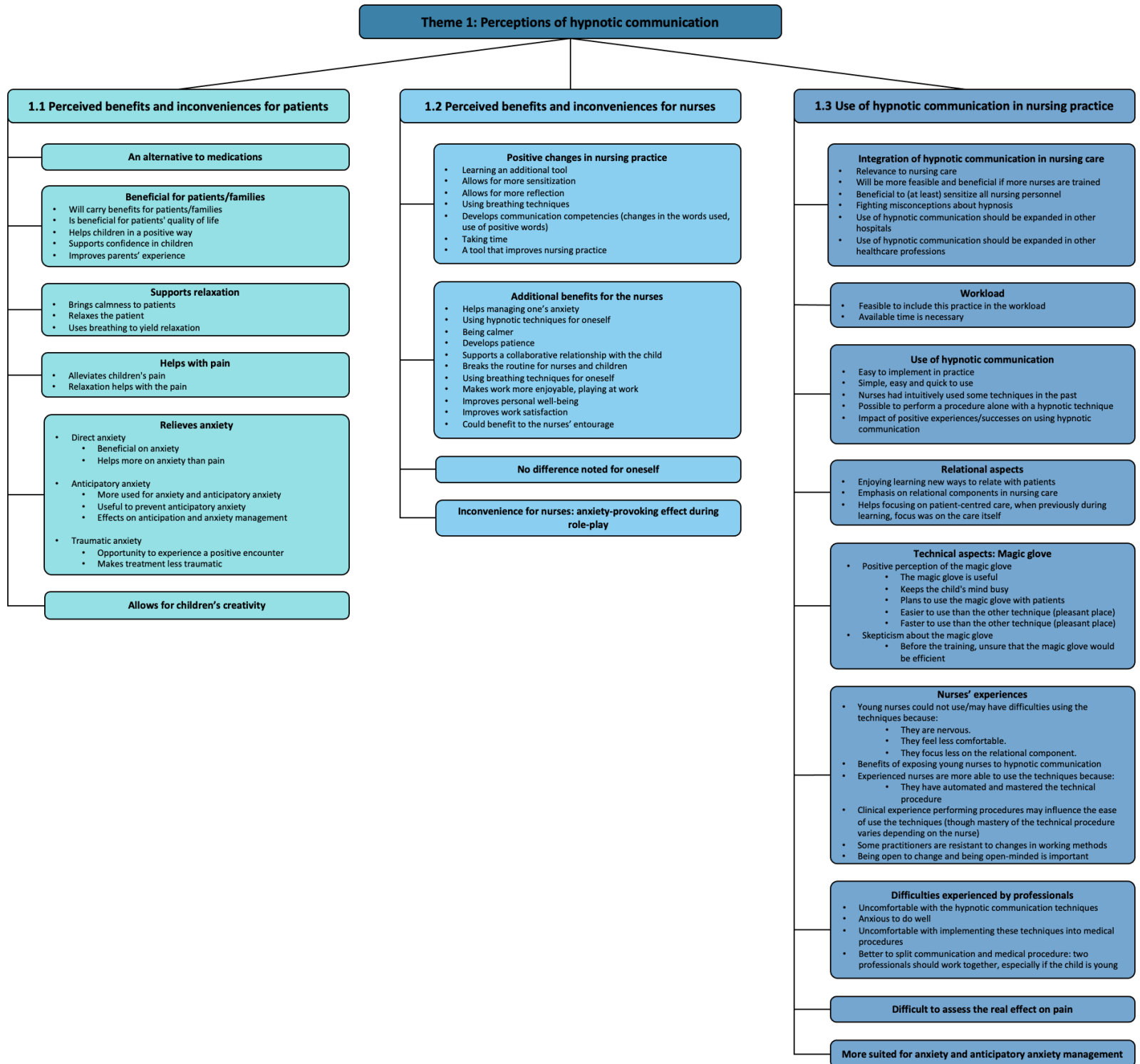
Themes	M	(SD)
1. Program relevance and acceptability		
Adequate	5.4	(0.55)
Enough sessions	5.4	(0.55)
Enough theoretical elements	5.2	(0.45)
Enough practical exercises	5.6	(0.55)
Easy-to-use manuals	4.2	(1.10)
2. Hypnotic communication		
Suitable for painful procedures	5.4	(0.55)
Simple to use in my daily practice	4.2	(0.84)
Easily integrated for a layperson	4	(0.71)
Improved my practice	5.2	(0.45)
Should be used in all pediatric hospitals	5.6	(0.55)
3. Expected effects		
Foster the relationship with the child	5.4	(0.89)
Reduce the child's pain	5.2	(0.84)
Reduce the child's distress	5.6	(0.55)
Reduce the child's anticipatory anxiety	5.6	(0.55)
Reduce my own emotions during the procedure	4.4	(1.34)
4. Program implementation		
Has its place in a project in a hospital setting	5.6	(0.55)

\*Total score out of 5. Responses were provided on a 6-level scale: "1" strongly disagree and "6" strongly agree.

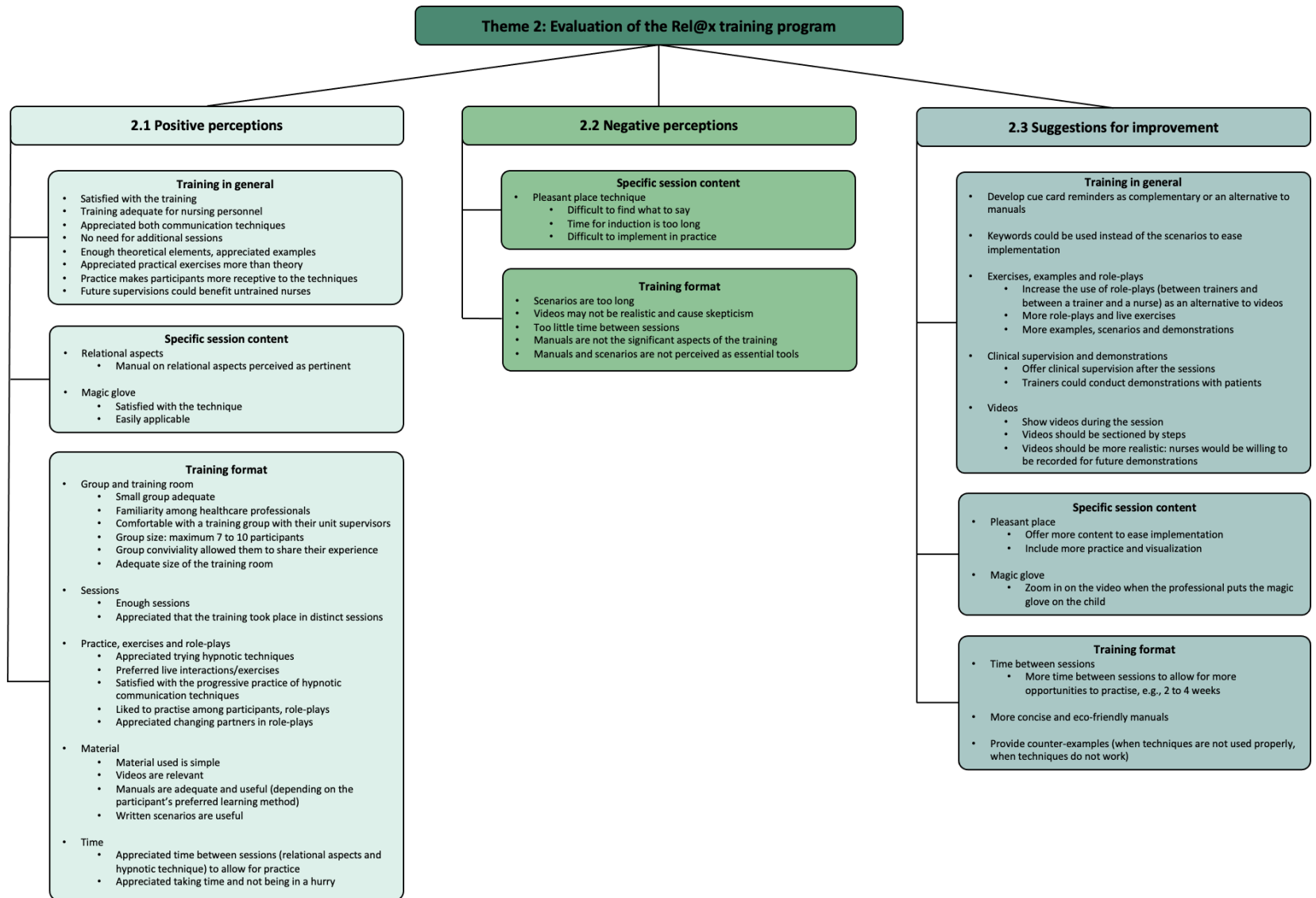


**Figure 2.**  
Full thematic  
trees

**Figure 2a.**  
Theme 1:  
Perceptions of  
hypnotic  
communication



**Figure 2b.**  
Theme 2:  
Evaluation  
of the  
Rel@x  
training  
program



**Table 2.** Nurses’ suggestions for the Rel@x training program’s improvement

Themes	Nurses’ suggestions for improvement	Modifications and/or decisions
<b>1. General comments</b>		
Exercises, examples and role-plays	Add role-plays between the trainers as well as between a trainer and a nurse	Role-plays were added to each training session. Each technique session now includes 3.5 hours of role-play and demonstrations.
	Add more role-plays between participants and live exercises	Role-plays between the nurses were added to each training session. Additional time was added to the live exercises in each technique training session to allow for more practice (Session 2).
	Add more examples, scenarios and demonstrations	Additional examples, scenarios and demonstrations were added to each training session according to participants’ questions: <ul style="list-style-type: none"> <li>• Session 1: when learning about verbal aspects as well as direct and metaphorical suggestions;</li> <li>• Session 2: when learning about the technique’s hypnotic language and when using the technique during a simulated medical procedure.</li> </ul>
Clinical supervisions and demonstrations	Offer clinical supervisions	The training now offers the possibility of following an additional e-learning module that serves as a recap. Participants may also contact the trainers by e-mail for additional questions.
	The trainers could conduct demonstrations with patients.	The training now offers the opportunity for the nurses to observe the trainers conduct demonstrations with actor-patients if requested.
Counter-examples	Provide counter-examples	Each training session now provides complex situations where hypnotic communication is not used properly.

## 2. Tools

Cue card reminders	Provide cue card reminders	Cue card reminders were added for each hypnotic communication technique.
Keywords	Have keywords instead of a scenario	To facilitate the integration and implementation of hypnotic communication in nurses' clinical practice, all verbatims were kept in the manuals. Keywords are now used in the cue card reminders available to nurses.
Videos	Preferable not to show the videos before the session	Videos are now shown during the training sessions.
	Have videos sectioned by steps	Current videos were modified and are now sectioned by steps.
	Offer more realistic videos	More realistic videos with nurses and patients are currently being produced and will be inserted in the final training version.
"Pleasant place" training session	Add more content, practice and visualization	The "pleasant place" training session now offers more theoretical content as well as more opportunities to practise and visualize the hypnotic technique being used.
"Magic glove" training session	In the video, zoom in when the professional puts the "glove" on the child.	No modifications were made to the video since the focus is actually on the words used by the professional, not how he puts the "magic glove" on the child's arm.

## 3. Format

Time between sessions	Add more time between sessions (relational and technical aspects)	Additional time was added (2 to 4 weeks) between relational and technical sessions.
Concise and eco-friendly manuals	Offer more concise and eco-friendly manuals	The training now offers cue card reminders as well as a virtual e-learning recap module.

# Rel@x training program evaluation

Participant ID : \_\_\_\_\_

Post-training questionnaire

**Since you have followed the Rel@x training program, please report your perception of the training by completing the following questionnaire. Place your response on the grid to the right: "1" means you strongly disagree and "6" means you strongly agree.**

## **I. Program relevance and acceptability**

*Overall, the training program ...*

- 1) is adequate to train a nurse in hypnotic communication.
- 2) has enough sessions to learn hypnotic communication.
- 3) proposes enough theoretical elements to learn hypnotic communication.
- 4) proposes enough exercises to practice hypnotic communication.
- 5) offers easy-to-use manuals.

1	2	3	4	5	6

*Comments regarding the program's relevance and acceptability:*

**II. Hypnotic communication**

*According to you, the practice of hypnotic communication ...*

- 1) is suitable for painful procedures.
- 2) is simple to use in your daily practice.
- 3) is easy to integrate for a layperson.
- 4) improved your practice considerably.
- 5) should be used in all pediatric hospitals.

1	2	3	4	5	6

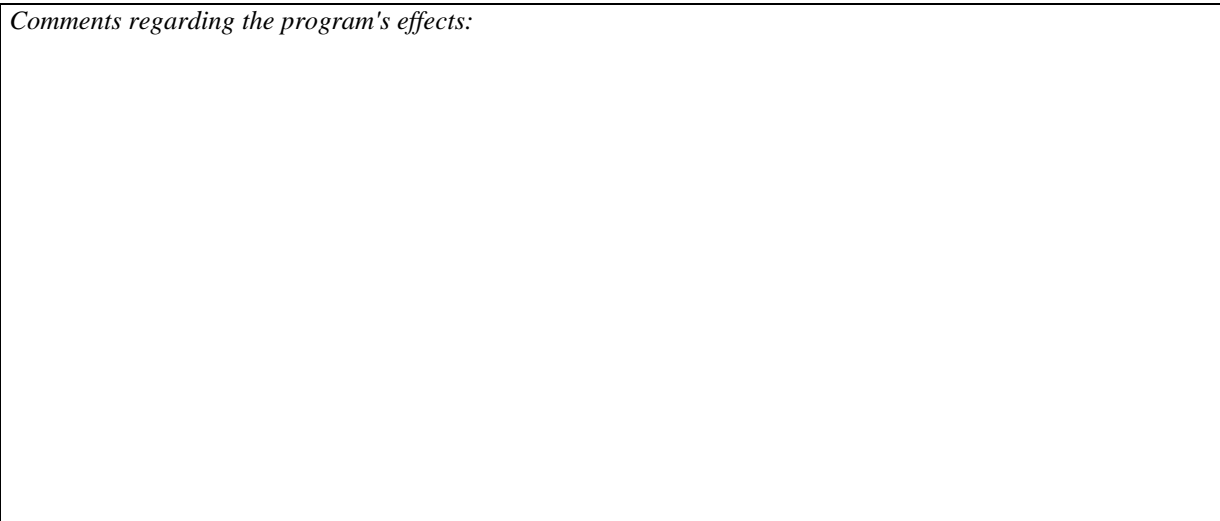
**III. Expected effects**

*According to you, the practice of hypnotic communication is likely/has allowed you ...*

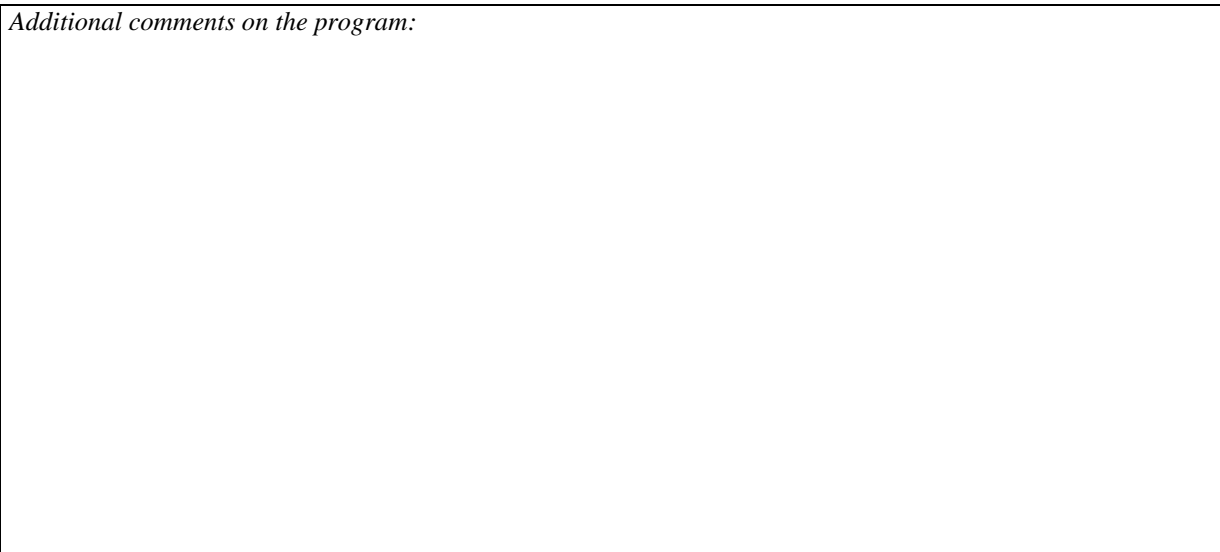
- 1) to foster the relationship with the child during the procedure.
- 2) to reduce the child's pain.
- 3) to reduce the child's distress.
- 4) to reduce the child's anticipatory anxiety.
- 5) to reduce your own emotions during the procedure.

1	2	3	4	5	6

*Comments regarding the program's effects:*



*Additional comments on the program:*



*As you have completed this training, do you need any additional supervision or support? If so, how much?  
Please explain.*



**IV. Program implementation**

*In your opinion, regarding the program's implementation, ...*

1) This training is appropriate in a university hospital setting.

1	2	3	4	5	6

*Comments regarding the program's implementation:*

**We thank you sincerely for your participation!**