Show, don't just tell
Koops van 't Jagt, Ruth

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Using photo stories to support doctor-patient communication. Three studies into a communicative health literacy intervention for older adults.

Ruth Koops van 't Jagt
Shu Ling Tan
John Hoeks
Sophie Spoorenberg
Sijmen A. Reijneveld
Andrea de Winter
Juliane Paech
Sonia Lippke
Carel J. M. Jansen

Abstract

Older adults often have limited health literacy and as a consequence experience more difficulties in communicating with healthcare professionals. In this study we tested whether a booklet containing photo stories on doctor-patient communication would outperform a non-narrative brochure on self-efficacy, behavioral intentions, and appreciation among older adults with low, medium and high levels of health literacy, and if there would be differences in preference expressed for the photo story booklet or the brochure.

We conducted two randomized controlled trials (RCTs): one in Germany (N=65) and one in the Netherlands (N=54), the latter one followed by a qualitative interview study among a subset of the participants (N=44). The photo story booklet included seven short picture-based stories about different themes related to doctor-patient communication, while the brochure had comparable pictures and lay-out and dealt with the same topics, but did not include any stories. Variables measured in the RCTs were self-efficacy, behavioral intentions to engage in recommended communication strategies, and appreciation, whereas in the qualitative study participants were asked to indicate their preference for the photo stories booklet or the brochure, and to indicate what their preference was based on.

In the RCTs, no statistically significant differences were found for the photo stories booklet compared to the brochure. In the interview study, however, a statistically significant majority of the participants expressed a preference for the photo stories, which were perceived as recognizable, relevant, entertaining and engaging.
Introduction

Low levels of health literacy have frequently been associated with poor health outcomes (Al Sayah, Majumdar, Williams, Robertson, & Johnson, 2013; Kim, 2009; Mõttus et al., 2014; Omachi, Sarkar, Yelin, Blanc, & Katz, 2013). Adults with limited health literacy experience more difficulties in participating in care consultations, ask fewer questions and report less patient-centred communication (Smith, Dixon, Trevena, Nutbeam, & McCaffery, 2010). Successful doctor-patient communication (Williams, Davis, Parker, & Weiss, 2002; Katz, Jacobson, Veledar, & Kripalani, 2007) seems to critically rely on sufficient levels of communicative and general health literacy (e.g. Nutbeam, 2000) and has been shown to be associated with patient satisfaction, clinical outcomes and adherence (Hall, Roter, & Katz, 1988; Roter, Hall, & Katz, 1988; Stewart, 1995).

The negative consequences of low health literacy may be even more severe for older adults, who often have to deal with multiple chronic conditions and are more likely to suffer from cognitive and sensory declines such as hearing loss and memory problems (Zamora & Clingerman, 2011). For older adults, doctors and other health care providers appear to be the most trusted and most frequently used source of health information, which makes the value of appropriate doctor-patient communication even more salient (Chaudhuri, Le, White, Thompson, & Demiris, 2013; National Cancer Institute, 2006). The importance of patient-provider communication for older adults with limited health literacy calls for the development and evaluation of interventions intended to support and empower older patients in health care interactions (Paech & Lippke, 2015). According to recent studies, there is a need for simple interventions that include communication factors, use familiar language and address patients’ barriers such as insufficient self-efficacy (McCaffery, Smith, & Wolf, 2010; Muscat, Morony, Shepherd, et al., 2015; Henselmans, Heijmans, Rademakers, & Van Dulmen, 2014; Ten Klooster, Oostveen, Zandbelt, Taal, Drossaert, Harmen, & Van de Laar, 2011; Koops van ‘t Jagt, Hoeks, Jansen, De Winter, & Reijneveld, 2016).

Photo stories or fotonovelas are increasingly used as health communication tools to inform and educate people with lower levels of health literacy about various health subjects (Koops van ‘t Jagt, Hoeks, Duizer, Baron, Molina, Unger, & Jansen, 2017; Boyte, Pilisuk, Matiella, & Macario, 2014; James, Reddy, Ruiter, Taylor, Jinabhai, Van Empelen, & Van den Borne, 2005; Unger, Cabassa, Molina, Contreras, & Baron, 2013; Unger, Molina, & Baron, 2009). The use of photo stories as educational tools can be considered an example of entertainment education, where messages are
purposely designed to both entertain and educate, in order to increase knowledge and change behavior (Singhal & Rogers, 1999). The integrated presentation of textual and visual information in picture-based stories to support information processing and learning is also in line with the principles of multimedia understanding (Sweller, Ayres, Kalyuga, 2011; Mayer, 2005; Mayer & Sims, 1994).

Using stories or narratives in health communication is also considered a promising strategy to reduce health literacy problems (Koops van ‘t Jagt, Hoeks, Jansen, De Winter, & Reijneveld, 2016). We therefore developed a narrative- and picture-based health literacy intervention, which includes seven photo stories on topics older adults’ frequently mentioned during focus group discussions on doctor-patient communication (see Koops van ‘t Jagt, De Winter, Reijneveld, Hoeks, & Jansen, 2016 for details on development). By portraying recognizable characters and step-by-step scenarios, the photo stories in our intervention were intended to address patients’ barriers to successful communication and to offer applicable strategies when patients encounter such barriers (Mar & Oatly, 2008).

Taking into account advantages of narrative health communication reported in the literature (e.g. Hinyard & Kreuter, 2007; Shen, Sheer, & Li, 2015; Braddock & Dillard, 2016; De Graaf, Sanders, & Hoeken, 2016), the photo story booklet may be able to increase people’s beliefs that they can perform the communication strategies embedded in the photo stories (self-efficacy), and thereby strengthen their intentions to engage in those communicative behaviors (i.e. behavioral intentions). Furthermore, the photo story format may be associated with higher levels of message appreciation.

The first aim of the present studies was therefore to assess the effects of a photo story booklet about doctor-patient communication on self-efficacy, behavioral intentions and appreciation, compared to a non-narrative booklet, among older adults with low, medium and high levels of health literacy. The second aim was to assess older adults’ preferences for the photo story booklet or the brochure we used, and to understand the reasons for possible differences in preferences. Three studies were conducted: a randomized controlled trial (RCT) in Germany, an RCT and an interview study in the Netherlands.

Methods

We conducted 1) an RCT in Germany (DE), comparing the photo story booklet and the brochure, including older participants with different levels of health literacy, 2) an RCT in the Netherlands (NL), comparing the photo story booklet and the
Interventions

Photo story booklet (Intervention group)

In our prior work, we developed a photo story booklet incorporating seven one-page stories with a participatory approach with older adults with limited health literacy (Koops van ‘t Jagt et al., 2016). The photo story booklet aims to increase older patients’ awareness, communicative self-efficacy and behavioral intentions, as a means to support and increase participation and communication during primary care consultations. The themes in the stories were: 1) general practitioner’s (GP) lack of attention; 2) bringing someone as support when stressed or nervous; 3) asking for plain language; 4) what to do when feeling uninformed about an overwhelming number of medicines; 5) implementation of lifestyle recommendations into concrete daily life actions; 6) medication management; and 7) making a question prompt sheet before your consult. Each theme was incorporated into a photo story using photographs including realistic characters and vivid pictures with captions and text balloons (see Figure 1).

Brochure (Control group)

We developed a non-narrative brochure based on the same content as the photo story booklet. The main message of each of the seven stories in the photo story booklet was presented as a general advice. In addition, each general advice was accompanied by one large picture that was selected from the pictures that were taken for the photo stories (see Figure 2). The brochure was developed considering multiple evidence-based design principles (e.g., a ‘multiple-feature revision’, see Koops van ‘t Jagt et al., 2016). The photo story booklet and the brochure were designed using the same colors, paper, size and front page. Below, we report on the methods of both RCTs and the interview study in greater detail.
FIGURE 1. Example page in English: photo story about bringing someone for support.
Tip 2

Ben je onzeker over je bezoek aan je huisarts? Klap je soms dicht tijdens het bezoek? Dan kun je een vriend of familielid meenemen om je te ondersteunen.

FIGURE 2. Example page in Dutch. Translation: Are you feeling insecure about visiting your GP? Bring a friend or family member to support you.
Study 1 and 2: RCTs in Germany and the Netherlands

In both countries, participants were randomly assigned following simple randomization procedures (computerized random numbers) to one of two conditions: 1) the photo story booklet or 2) the brochure. Inclusion criteria were as follows: 1) age ≥50 years; 2) native speaker of German or Dutch, respectively; 3) Health Literacy sum score <6 or >7 for Dutch participants.

Participants

In Germany, we recruited 65 participants with different levels of health literacy, aged between 54 and 94 years (30.8% male, N=20), from senior day care and rehabilitation centers, and sports clubs.

In the Netherlands, we recruited 54 older-old participants with lower and higher levels of health literacy, aged between 77 and 95 years old (34.5% male, N=19), from an existing research database of participants of Embrace (Spoorenberg, Uittenbroek, Middel, Kremer, Reijneveld, & Wynia, 2013). Embrace is a population-based, person-centered and integrated care service for community-living older adults aged 75 years and older living in the Northern part of the Netherlands. We invited eligible participants based on lower levels of health literacy (Health Literacy Sum 0-5) or higher levels of health literacy (Health Literacy Sum 8-12). The Embrace research database includes participants’ levels of health literacy based on the Set of Brief Screening Questions on Health Literacy (SBSQ). Eligible participants received an invitation to participate in the study, with the possibility of returning a reply-card if they did not want to participate. People who did not return the reply-card within two weeks received a phone call from one of the researchers inviting them to plan an interview appointment. People could still refuse participation during those calls.

Measures

Self-efficacy, behavioral intentions and appreciation were measured through a questionnaire. Answers to the questionnaire items could be given on 5-point Likert scales. To enhance ease of processing, we added green checkmarks for positive answers, red crosses for negative answers and a question mark for ‘I don’t know’ to the answering scales of all items. Cronbach’s alphas were calculated for all scales (item scores were reversed where necessary). Mean values were only calculated when alpha was satisfactory $\alpha \geq .65$).

Outcomes

For all participants, basic demographic and other background information was collected, including the AURA (Ask, Understand, Remember Assessment – a brief
measure of communication self-efficacy in clinical encounters; Clayman, Pandit, Bergeron, Cameron, Ross, & Wolf, 2010), perceived health, and the frequency of GP consultations. In addition, the set of brief screening questions on health literacy (SBSQ; Chew, Bradly, & Boyko, 2004) was used to calculate a Health Literacy Sum in order to assign participants to the low or high health literacy group.

Self-efficacy (DE: α=.65; NL: α=.81) and behavioral intentions (DE: α=.76; NL: α=.83) were measured with one item per measure for each of the seven stories and subsequent communication themes, using questions like: ‘Imagine you feel insecure about a visit to your doctor, or that you have the feeling that you could fall silent during the conversation. Do you think it would be easy for you to bring someone to support you?’ for self-efficacy (1 = No, not at all; 5 = Yes, very much) and ‘Imagine you feel insecure about a visit to your doctor, or that you have the feeling that you could fall silent during the conversation. Do you think you will bring someone to support you next time?’ (1 = No, certainly not; 5 = Yes, I certainly will).

Appreciation was defined as overall satisfaction, and was measured with seven items (DE: α=.68; NL: α=.79). Users were asked if they found the intervention difficult (reverse coded); interesting; monotonous (reverse coded); boring (reverse coded); fun; informative; long (reverse coded) (1 = No, not at all; 5 = Yes, very much).

Groups of participants differing in health literacy level were formed in both samples. In the German sample, the ‘low level’ group (N=13) had health literacy sum scores below 6, the ‘medium level’ group (N=12) had health literacy sum scores of 6 or 7, while the ‘high level’ group had health literacy sum scores of 8 and higher (N=40). In the Dutch sample the ‘low level’ group (N=14) had health literacy sum scores below 6; the ‘high level’ group (N=40) had health literacy sum scores of 8 and higher (corresponding to cut-off point as used in Geboers et al., 2016). As a result, only in the German sample participants with medium levels of health literacy were included in data collection and analysis. In subsequent analyses of data collected in each of the RCT’s, health literacy level was entered as a between-participants factor.

Procedure
All participants signed a consent form and agreed to participate and be audio recorded (Dutch interview participants, see Study 3 below). All participants confirmed they were aware they could withdraw any time, and approved of the fact that the results would be used and published for research purposes. In Germany, participants were asked to fill out the demographic part of the questionnaire, including the SBSQ (before they were instructed to read either the photo story booklet or the brochure).
After finishing reading, German participants were instructed to fill out the second part of the questionnaire, which contained the items measuring self-efficacy, behavioral intentions and appreciation. In the Netherlands, after participants finished reading the booklet or the brochure, they were interviewed based on a pre-structured questionnaire including both demographic questions as well as primary outcomes. Research assistants noted the answers to the questionnaire. In both studies, participants were instructed to read at their own pace.

**Ethics approval**

The RCT in Germany was approved by the ethical board of the Deutsche Gesellschaft für Psychologie (DGPs). The RCT in the Netherlands was approved by the Research Ethics Committee (CETO) of The Faculty of Arts, University of Groningen and is registered in the Dutch Trial Register (number 5810).

**Analysis**

For self-efficacy and behavioral intentions we performed an analysis of variance with theme (theme1 to theme7) as a repeated measure, under which measure (self-efficacy versus behavioral intention) was nested. Theme and measure were included in order to reduce variance related to possible differences between the seven separate themes included in both interventions and between both measures (i.e. self-efficacy and behavioral intention. Format (photo story booklet versus brochure) and health literacy group (low versus high for the Netherlands, low, medium or high for Germany) acted as independent between-participant variables.

For appreciation we performed a univariate ANOVA on the mean appreciation scores per booklet as appreciation was not measured per theme but per booklet, with format (photo story booklet versus brochure) and health literacy group as between-participant variables. For all analyses, we considered changes to be statistically significant at $p<0.05$ (two-tailed).

**Study 3: an interview study in the Netherlands**

**Participants**

All 54 Dutch RCT participants were invited for the interview study. Ten interviews were excluded from analysis because no audio recordings were available.

**Measures**

We assessed preference for one of the two interventions by asking participants to indicate 1) which format they believed was the best, and 2) which format they would like to take home. Participants were also asked to provide reasons for their
Procedure
After having answered the questions for the RCT, participants were asked to take a look at the other brochure: Participants who had read the photo story booklet were asked to take a look at the brochure now, and vice versa. Subsequently, participants were asked to indicate their preference and to provide an explanation.

Analysis
Preferences for either the photo story booklet or the brochure and explanations for this preference were analysed both quantitatively and qualitatively. Verbatim transcripts of preference and explanations for preference were available for 44 interview participants. For the quantitative analysis, we counted the number of times one of the two options was the preferred choice. The qualitative analysis was conducted by the first author (RK) using a data driven approach based on the framework analysis method (Ritchie, Spencer, & O’Connor, 2003) and which was guided by two questions: a) “Which reasons do participants provide for preferring either the photo story booklet or the brochure?” and b) “How are these reasons related to basic principles of information processing such as attention and motivation, comprehension and action?” The categorization of the explanations provided was based on standard and dual theoretical models of information processing (e.g. McGuire, 1972, 1978; Petty & Cacioppo, 1984, 1996), distinguishing the following communicative aspects: 1) Attention for the message / motivation to process the message (attention and motivation), 2) Ability to process the message (comprehension) and 3) Subsequent mental and behavioral consequences of the message (action).

Results
Participants Study 1 and Study 2
Table 1 provides a summary of participant characteristics of the RCTs in Germany and The Netherlands.
### TABLE 1. Participant characteristics (means and standard deviations) in both RCTs

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>The Netherlands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>photo story booklet (N=34)</td>
<td>brochure (N=32)</td>
</tr>
<tr>
<td>Age</td>
<td>73.2 (5.4)</td>
<td>76.8 (8.5)</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>24 (70.6%)</td>
<td>22 (68.8%)</td>
</tr>
<tr>
<td>Age (range)</td>
<td>62-80</td>
<td>54-94</td>
</tr>
<tr>
<td>Education (in years)</td>
<td>10.74 (2.03)</td>
<td>10.72 (2.26)</td>
</tr>
<tr>
<td>Health (1-5)</td>
<td>3.33 (.85)</td>
<td>3.28 (.96)</td>
</tr>
<tr>
<td>Visiting frequency GP (1-6)</td>
<td>2.62 (.99)</td>
<td>2.66 (.97)</td>
</tr>
<tr>
<td>AURA Sum (4-20)</td>
<td>15.76 (3.64)</td>
<td>16.22 (2.90)</td>
</tr>
<tr>
<td>Health Literacy Sum (0-12)</td>
<td>7.61 (2.28)</td>
<td>7.81 (2.24)</td>
</tr>
</tbody>
</table>

**NOTE.** Higher numbers represent better scores for health, AURA and health literacy. In Germany, participants were directly asked to provide a numerical estimate of years of education, while in the Netherlands years of education was estimated in the following way by ‘translating’ participants’ answers on the following Likert scale into years of education: 1: Less than 6 classes of primary school: 3 years of education; 2: 6 Primary school classes: 6 years of education; 3: More than primary school / primary school with uncompleted follow-up education: 7 years of education; 4: Practical training: 9 years of education; 5: Secondary vocational education: 10 years of education; 6: Pre-university education: 12 years of education; 7: University / higher professional education: 16 years of education. This might have led to differences in estimations of Education for both countries.

Health: 1= poor, 2= reasonable, 3= good, 4= very good, 5= excellent. Visiting frequency GP: 1= less than once a year, 2= every six months, 3= quarterly, 4= monthly, 5= every two weeks, 6= at least once a week. AURA is an instrument measuring communication self-efficacy in clinical encounters based on four questions (Is it easy for you to…?) using a five-point scale, with higher sum scores representing higher levels of communication self-efficacy. Health Literacy Sum is calculated by summing scores between 0 to 4 for the three Health Literacy Questions from the SBSQ (Chew, Bradley, & Boyko, 2004).

Between the two countries, significant differences were found for age (Dutch sample older), years of education (Dutch sample lower level of education), health (Dutch sample poorer health) and GP visiting frequency (Dutch sample reporting less GP visits).
Study 1: RCT in Germany
No significant main or interaction effects of format or health literacy level on self-efficacy and behavioral intention were found (p-values>.20; $\eta^2=.004-.052$). Table 2 shows the mean levels of self-efficacy and behavioral intention for both conditions and all health literacy groups. No significant main or interaction effects of format or health literacy level on mean appreciation scores measured with seven appreciation statements were found (p-values>.27; $\eta^2=.007-.027$); means and standard errors: means and standard errors: 3.82 (0.57), 3.53 (0.63) and 3.71 (0.83) for the photo story booklet; 3.52 (0.55), 3.09 (1.73) and 3.62 (0.85) for the non-narrative brochure. Excluding participants with medium levels of health literacy from these analyses did not alter results.

<table>
<thead>
<tr>
<th></th>
<th>photo story booklet</th>
<th>brochure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low HL</td>
<td>Medium HL</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low HL</td>
<td>3.98 (0.28)</td>
<td>3.63 (0.28)</td>
</tr>
<tr>
<td>Medium HL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High HL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low HL</td>
<td>4.02 (0.22)</td>
<td>3.96 (0.21)</td>
</tr>
<tr>
<td>Medium HL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High HL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE. HL = health literacy. Self-efficacy was measured using statements formulated as follows: Do you think it would be easy for you to (communication strategy)? 1= No, not at all, 2= No, not really, 3 = I don’t know, 4= Yes, a little, 5= Yes, very much. Intention was measured using statement formulated as follows: Do you think you will (communication strategy) next time? 1= no, certainly not, 2= no, I don’t think so, 3= I don’t know, 4= Yes, I think so, 5= Yes, I certainly will.

Study 2: RCT in the Netherlands
No significant main effects of format on average levels of self-efficacy and behavioral intention were found (F(1,48)=3.21; p=.079; $\eta^2=.063$). However, we found a significant main effect of health literacy level (F(1,48)=11.01; p=.002; $\eta^2 =.187$), with higher average levels of self-efficacy and behavioral intention for the higher health literacy group compared to the lower health literacy group; means and standard errors: 4.43 (0.11) and 4.37 (0.11) versus 3.74 (0.18) and 3.76 (0.18). Table 3 shows the mean levels of self-efficacy and behavioral intention for both conditions and both health literacy groups. No significant interaction effects of format and health literacy group on self-efficacy and behavioral intention were found (F(1,48)=.57; p=.46; $\eta^2=.012$).
TABLE 3. Average levels of self-efficacy and behavioral intentions for each Health Literacy Group for both conditions (means and standard errors,) in The Netherlands

<table>
<thead>
<tr>
<th></th>
<th>photo story booklet</th>
<th>brochure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low HL</td>
<td>High HL</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>3.65 (.25)</td>
<td>4.14 (.15)</td>
</tr>
<tr>
<td>Intention</td>
<td>3.63 (.26)</td>
<td>4.15 (.16)</td>
</tr>
</tbody>
</table>

NOTE. HL = health literacy. Self-efficacy was measured using statements formulated as follows: Do you think it would be easy for you to (communication strategy)? 1= No, not at all, 2= No, not really, 3 = I don’t know, 4= Yes, a little, 5= Yes, very much. Intention was measured using statement formulated as follows: Do you think you will (communication strategy) next time? 1= no, certainly not, 2= no, I don’t think so, 3= I don’t know, 4= Yes, I think so, 5= Yes, I certainly will.

No significant effects for format (photo story booklet versus brochure), health literacy group (low versus high) or their interaction on appreciation were found (all p-values>.32, $\eta^2=.002-.019$); means and standard errors: 4.08 (0.97) and 4.33 (0.45) for the photo story booklet; 3.94 (0.93) and 4.08 (0.73) for the brochure.

Study 3: an interview study in the Netherlands

Participants

Table 4 provides an overview of the characteristics of the 44 interview participants. A comparison between Study 2 and Study 3 revealed no systematic differences between the total group of Dutch participants and the subset of interview participants
TABLE 4. Participant characteristics (means and standard deviations) in the interview study

<table>
<thead>
<tr>
<th></th>
<th>photo story booklet (n=24)</th>
<th>brochure (n=20)</th>
<th>total (n=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>82.3 (2.7)</td>
<td>84.2 (4.5)</td>
<td>83.2 (3.7)</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>16</td>
<td>13</td>
<td>29</td>
</tr>
<tr>
<td>Age (range)</td>
<td>79-88</td>
<td>79-95</td>
<td>79-95</td>
</tr>
<tr>
<td>Education (in years)</td>
<td>8.86 (2.90)</td>
<td>9.00 (3.23)</td>
<td>8.93 (3.02)</td>
</tr>
<tr>
<td>Health (1-5)</td>
<td>2.38 (.88)</td>
<td>2.25 (.64)</td>
<td>2.32 (.77)</td>
</tr>
<tr>
<td>Visiting frequency GP (1-6)</td>
<td>2.50 (1.10)</td>
<td>2.15 (1.09)</td>
<td>2.34 (1.10)</td>
</tr>
<tr>
<td>AURA Sum (4-20)</td>
<td>15.92 (3.80)</td>
<td>16.95 (2.82)</td>
<td>16.39 (3.39)</td>
</tr>
<tr>
<td>Health Literacy Sum (0-12)</td>
<td>8.71 (2.90)</td>
<td>8.50 (3.46)</td>
<td>8.61 (3.13)</td>
</tr>
</tbody>
</table>

NOTE. Higher numbers represent better scores for health, AURA and health literacy. Health: 1= poor, 2= reasonable, 3= good, 4= very good, 5= excellent. Visiting frequency GP: 1= less than once a year, 2= every six months, 3= quarterly, 4= monthly, 5= every two weeks, 6= at least once a week. AURA is an instrument measuring communication self-efficacy in clinical encounters based on four questions (Is it easy for you to...?) using a five-point scale, with higher sum scores representing higher levels of communication self-efficacy. Health Literacy Sum is calculated by summing scores between 0 to 4 for the three Health Literacy Questions from the SBSQ (Chew, Bradley, & Boyko, 2004). No significant differences between the two groups occurred in any of the test variables.

Preference

A statistically significant majority of participants (66.7%, z=2.450, p=.014) found the photo story booklet better than the brochure. A statistically significant majority of participants (77.6%, z= 3.85, p=<.001) said they would choose to take the photo story booklet home. Several participants (14.3%) indicated they would like to take both booklets home. Participants who had read the photo story booklet first did not differ in preference from participants who had read the brochure first (X²(2,54)= 4.49, p=.11 for Q1, X²(4,50)= 5.07, p=.28 for Q2). Notably, some participants did not see themselves as belonging to the target group for both booklets, but thought that acquaintances or relatives would profit from one of both: ‘Yes, well my memory is still good, so I think I like this one (brochure), but when you have dementia or something, then this one (photo story booklet) is probably better, easier to understand.’ (female, 83 years, higher HL). ‘If I had a booklet like this (photo story booklet) at home and someone came to me with problems, I would say: read this. Yes, I would do that.’ (female, 85 years, higher HL).
Table 5 presents the most frequent types of explanations for the preferences for either the photo story booklet or the brochure as indicated during the interviews. The explanations suggest that the photo story booklet outperformed the brochure when it comes to attracting attention (attention and motivation), processing ease (comprehension), and action (i.e. emotional and behavioral appeal) for most participants. They found photo stories an appealing format, which could help people through the step-by-step examples. Participants who preferred the brochure generally did so because they felt the general advice was shorter, simpler and more ‘to the point’, which mostly relates to comprehension. Both brochures seem to encourage most participants (25 out of 44) to share their own experiences regarding doctor-patient conversations with the interviewers (action), as illustrated by the following statement:

The last one that I have here (photo story booklet) is exactly what happened to me with that doctor, in the hospital, when she (family member) had a heart attack, […] Anyway, I told him: doctor could you please speak a little more slowly. I didn’t want to say: doctor, don’t look at your computer screen all the time. Because he was… he was looking at it constantly. (female, 83 years, higher HL).

Five participants referred to the photo story booklet in particular as supporting readers in making action plans for future scenarios:

Fun to read. And, um, I believe it’s really good. Also on what you should say to your doctor, could say (to your doctor), that you can bring your notes, and that you can always call if you fail to understand something. (female, 85 years, higher HL).

Listen, in that one (photo story booklet) there are a lot more things that make you think: well I’m going to use that next time. For example when you have some ailment, and they ask you – well I will make a list of my medicines. (male, 79 years, higher HL).

Several participants also noted that general advice is not sufficient and that the specific real life examples portrayed in the photo stories make the content more comprehensible:
Finally, some participants explicitly suggested that both the photo story booklet and the brochure would work well together:

When you have this one (brochure) and then read the other one (photo story booklet) after that, then you have all the details. When you read this one and you think ‘what does this mean?’ then you can read that in the other one. The first one is just the short version. (female, 82 years, higher HL).

Yeah, I think this is more like a part 2. You have to read this one first (brochure) and then you have to read the second one (photo story booklet) and then it’s easier to understand (the content of the brochure). (female, 86 years, higher HL).
### TABLE 5. Explanations for preference grouped according to factors related to attention and motivation, comprehension and action

<table>
<thead>
<tr>
<th>Q1: Best?</th>
<th>Attention and motivation</th>
<th>photo story booklet</th>
<th>brochure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attractiveness</td>
<td>mentions</td>
<td>Illustrative Quotes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>“That one speaks to me more, it’s more pleasant.’ ‘I already know I like that one better, it’s more playful, I like it a lot more.”</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>10</td>
<td>“That one has more information.’ ‘In that one it’s explained a bit more.”</td>
</tr>
<tr>
<td></td>
<td>Elaborateness</td>
<td>15</td>
<td>“It’s very clear and the situations are explained very well.’ ‘The way it’s written makes everything very clear.’ ‘This is very clear and easy to understand, because of the stories.’</td>
</tr>
<tr>
<td></td>
<td>Clearness</td>
<td>2</td>
<td>“It’s written in a simple style.’ ‘This one reads quicker.”</td>
</tr>
<tr>
<td></td>
<td>Comprehensibility</td>
<td>4</td>
<td>“In that one you see pictures. Like it is in daily life.’ ‘No it’s all really familiar and recognizable for me.’</td>
</tr>
<tr>
<td></td>
<td>Recognisability / relevance</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Action</td>
<td>1</td>
<td>“This one has more pictures, it’s much more visual.”</td>
</tr>
<tr>
<td></td>
<td>Mental processing</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emotional appeal</td>
<td>3</td>
<td>“Uhm, it gets to you more. It speaks to you.”</td>
</tr>
<tr>
<td>photo story booklet</td>
<td>brochure</td>
<td></td>
<td></td>
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<tr>
<td>---------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>n mentions</td>
<td>Illustrative Quotes</td>
<td>n mentions</td>
<td>Illustrative Quotes</td>
</tr>
<tr>
<td><strong>Behavioural appeal</strong></td>
<td>1</td>
<td>&quot;You respond to this one quicker.&quot;</td>
<td>0</td>
</tr>
<tr>
<td><strong>Q2: Take home?</strong></td>
<td><strong>Attention and motivation</strong></td>
<td><strong>Attractiveness</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td><strong>Elaborateness</strong></td>
<td>11</td>
<td>&quot;Because there’s more to read in that one. ‘That one is just a little more elaborate.’</td>
</tr>
<tr>
<td><strong>Clearness</strong></td>
<td>5</td>
<td>&quot;Clear example situations.” ‘Clear information.” ‘Easy to understand.”</td>
<td>0</td>
</tr>
<tr>
<td><strong>Comprehensibility</strong></td>
<td>3</td>
<td>&quot;That one’s easier to read, I think.”</td>
<td>2</td>
</tr>
<tr>
<td><strong>Recognisability / relevance</strong></td>
<td>2</td>
<td>&quot;And, well, those questions, they are very identifiable. When you’re at the doctors.” ‘Because there are so many things in there that are recognizable to me.’</td>
<td>0</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td><strong>Mental processing</strong></td>
<td>2</td>
<td>&quot;And if you look at those examples, it’s easier to remember.” ‘That one makes you think more, I guess.”</td>
</tr>
</tbody>
</table>
Participants with low levels of health literacy who preferred the photo story booklet mentioned factors related to *Comprehension (comprehensibility)* 16 out of 18 times. Participants with low levels of health literacy who preferred the brochure mentioned factors related to *Comprehension (comprehensibility)* 2 out of 3 times. Participants with high levels of health literacy who preferred the photo story booklet mentioned factors related to *Comprehension (comprehensibility)* 40 out of 59 times. Participants with high levels of health literacy who preferred the brochure mentioned factors related to *Comprehension (comprehensibility)* 5 out of 7 times.

### DISCUSSION AND CONCLUSION

#### General Discussion

We found no differences between a narrative communication intervention (a photo story booklet) and a brochure about doctor-patient communication on self-efficacy, behavioral intentions or appreciation measured with a printed questionnaire. However, oral interviews among a subset of Dutch participants revealed that the majority of these participants preferred the photo story booklet compared to the brochure when given the choice.

First, the lack of significant differences in self-efficacy, behavioral intentions or appreciation between the photo story booklet and brochure in both RCTs may be explained by the relatively small difference between the two formats. The brochure was purposely designed as a ‘plausible rival’ of the photo story booklet and it was carefully developed taking into account evidence-based design principles (e.g., a multiple-feature revision, Koops van ‘t Jagt et al., 2016), including the same type of evidence-based topics as the photo story booklet. In addition, the brochure contained large photographs portraying the same characters that played a role in the photo story booklet. It cannot be excluded that these photographs may have induced some form of narrative processing.

Second, it should be noted that the measurements of self-efficacy and behavioral intentions on the one hand and preference on the other reflect different aspects

<table>
<thead>
<tr>
<th>Action</th>
<th>Emotional appeal</th>
<th>photo story booklet</th>
<th>n mentions</th>
<th>Illustrative Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>‘Because you, how do I explain this, can sympathize with that one more easily.’ ‘You really feel this one.’</td>
</tr>
<tr>
<td>Behavioural appeal</td>
<td></td>
<td>brochure</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Behavioural appeal</th>
<th>photo story booklet</th>
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<th>Illustrative Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>‘You get more out of that one.’</td>
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</tbody>
</table>

<table>
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<tr>
<th>Behavioural appeal</th>
<th>brochure</th>
<th>n mentions</th>
<th>Illustrative Quotes</th>
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</table>
of information processing. Although no differences were found in effects related to action (self-efficacy and behavioral intentions), the difference we did find in motivation (preference) suggests that in a natural context people might be more willing to read the photo story booklet than the brochure. Evidently, willingness to read a given document is a necessary condition for any processing effect to occur. Third, based on the post-test design of the present study, only a comparison between two highly comparable conditions was possible. It is possible that both brochures used in this study would outperform ‘care as usual’ and more traditional formats of health communication. However, to test this would be an aim of a future study.

Explanations for Preferences
A majority of participants in our third study had a distinct preference for the narrative intervention, because they found the photo story booklet recognizable, relevant, entertaining and engaging. Participants referred to possible positive effects of the photo story booklet by stating that the stories could help people through their step-by-step scenarios, that the photo stories could be read multiple times and still be interesting, and that they considered the photo story booklet to be an appealing format, which would attract readers.

Several participants noted that general advice as provided in the brochure is not sufficient to support people in communicating with their doctor and that the specific, more elaborate examples portrayed in the photo stories help to formulate action plans (Lippke, Ziegelmann, & Schwarzer, 2004; Schwarzer, 2008). The photo stories seemed to help readers to bridge the intention-behavior gap (Boeijinga, Hoeken & Sanders, 2016). The concrete behavioral and verbal responses embedded in the photo story scenarios provide ‘If-Then’ plans or implementation intentions, which have been shown to help people reaching goals (Gollwitzer & Sheeran, 2006). This suggests that the photo story booklet not only informs and educates its readers, but also teaches them skills, supports implementation intentions and thus behavioral change, which is in line with the core components of effective health literacy interventions as identified in, for instance, the IROHLA project (see Paech & Lippke, 2015; see also Nutbeam, 2000). Using visual narratives, such as photo stories, may be particularly effective in stimulating mental imagery, which is assumed to be an important factor in the formulation of implementation intentions (Knauper, Roseman, Johnson, & Krantz, 2009; Fennis, Adriaanse, Stroebe, & Pol, 2011). While in both RCTs reading the photo story booklet or the brochure proved to be associated with relatively high average levels of self-efficacy and behavioral intentions, photo stories might help to turn those intentions into action plans, as is suggested by five
participants’ comments in the interview study.

Personally relevant visual stories may result in richer mental representations or ‘situation models’ (e.g., Zwaan, 2016) of the situations depicted, compared to mental representations that are built on the basis of the more general formulation of advice. Such richer situation models based on photo stories may provide people with a better mental toolkit to perform the suggested (communicative) strategies or behaviors.

**Strengths and Limitations**

*Strengths*

A major strength of this study is the combination of studies in two different European countries using a mixed-methods design (Craig, Dieppe, Macintyre, Michie, Nazareth, & Petticrew, 2008). By conducting two RCTs and an interview study, we are able to provide valuable information on the effects of a photo story booklet and a brochure on doctor-patient communication, and the preference for either format among a population of older adults with different levels of health literacy. By combining multiple methods, we gained insights on outcomes of the health document interventions we tested as well as on the processes by which such interventions might achieve their effects.

*Limitations*

Some limitations of this study should be considered. First, in both RCTs, the absence of a pre-test or a ‘care as usual’ condition made it impossible to detect the effectiveness of either the photo story booklet or the brochure per se. Second, we were not able to collect qualitative data from our German participants, so we cannot compare the two countries in that respect. In addition, the two samples differed on a number of characteristics, which may have added some random variation and thus have contributed to the null finding. Third, this study was only sufficiently powered to detect large effect sizes (Field, 2009; power calculations in G*Power 3.1, Faul, Erdfelder, Lang, & Buchner, 2007). Although we aimed to recruit more participants, this proved to be difficult in this particular target group (see also Bonevski, Randell, Paul, Chapman, Twyman, Bryant, Brozek, & Hughes, 2014; Liljas, Walters, Jovicic, Iliffe, Manthorpe, Goodman, & Kharicha, 2017 on challenges in engaging the hard-to-reach in studies on health topics). In addition, some participants with lower levels of health literacy had difficulties answering the questionnaire, as was indicated by interviewers’ observations that they struggled with the hypothetical character of some statements (see also Schwarz, 1999).
Implications
The results from the RCTs and interview study may have the following implications for research and practice. Further studies might again explore, especially for older adults with limited health literacy, if the photo story booklet and brochure increase peoples’ levels of self-efficacy and behavioral intentions when communicating with their doctor. To this end, it would be valuable to include pre- and post-test measurements, to explicitly assess participants for long term effects on their behavior and the determinants thereof in real doctor-patient communication. In addition, our findings point out a need for studying the effects of health communication interventions on both attention, motivation, and comprehension as well as the impact of such interventions on knowledge, attitude, norms and behaviour (action). Future studies could for instance explore which format is associated with higher rates of spontaneous pickups and reading behavior in natural contexts such as GP waiting rooms (attention and motivation), which format is easy to process and remember (comprehension) and whether the interventions may affect patients’ communication behavior in primary care consultations (action). Finally, it would be useful to explore whether combining the photo stories with the advice contained in the brochure would increase the effectiveness of this type of communicative health literacy intervention.

Conclusion
No differences in effectiveness or appreciation for the photo story booklet compared to the brochure were found in both RCTs. However, participants in the interview study liked the photo story booklet more, felt more motivated, and believed that they could understand the content easier, and apply it better to daily life in terms of action planning or implementation intentions.

In sum, the integrated results of these three studies suggest that it may be fruitful to combine standard formats of health communication (e.g., general advice) with narrative formats (e.g., photo stories). Future studies should establish whether photo stories support doctor-patient communication.

Notes
1. This was related to differences in recruitment procedure.
References


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