How oncologists' communication impacts patients' information recall and emotional stress

A video-vignettes approach

Visser, N.C.

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Assessing engagement while viewing video vignettes; validation of the Video Engagement Scale (VES)

This chapter is published as:
*These authors have contributed equally to this work.
ABSTRACT

Objectives
In health communication research using video vignettes, it is important to assess viewers’ engagement. Engagement scores can indicate ecological validity of the design, and help distinguish between different engagement types. Therefore, we aimed to develop and validate a scale assessing viewers’ engagement with video vignettes.

Methods
Based on an existing question set, the 15-item, five-dimensional Video Engagement Scale (VES) was developed. The VES was validated in two studies using video vignettes to investigate patient-physician communication. In addition to engagement, we assessed its presumed correlates, e.g., perceived realism of the video and identification with the patient.

Results
Internal consistency and test-retest reliability were adequate in both studies (sample sizes: \( N = 181 \) and \( N = 228 \)). Positive correlations between the VES and perceived realism of the video, credibility of and identification with the patient suggested good content validity. Confirmatory factor analysis suggested a four-dimensional model fit, largely resembling our hypothesized model.

Conclusions
The VES reliably and validly measures viewers’ engagement in health communication research using video vignettes. It can be employed to assess ecological validity of this design. Further testing of the scale is needed to more solidly establish its dimensionality.

Practice Implications
We recommend that researchers use the VES, to ensure ecological validity of future video-vignettes studies.
Chapter 2 | Assessing engagement while viewing video vignettes; validation of the VES

INTRODUCTION

Researchers in health communication increasingly use approximations of reality as a substitute for real-life situations, in the form of written scenarios, virtual reality or role-playing (see for example [1-3]). Video-taped scenarios are a specific type of approximations displaying either recordings of actual situations [4] or scripted and role-played simulations [5]. Scripted videos are increasingly used in studies using experimental video-vignettes designs to study patient-provider communication [6]. Such designs allow systematic testing of the effects of specific communication, by creating multiple variations of the video. Moreover, video vignettes allow researchers to assess viewers’ experience of the events in the video without exposing them to the actual situation thus providing an ethical alternative to investigating effects of patient-provider communication in medical situations [6].

Participants in video-vignettes studies focused on medical communication are referred to as analogue patients (APs). APs can either be healthy individuals or (former) patients. They are instructed to imagine themselves to be in the video-patient’s situation [7]. During or after viewing the vignette, APs’ perception of (aspects of) communication, self-reported emotional distress, information recall, physiological arousal, or other outcomes van be assessed. Thus, APs are used as proxies for clinical patients in real medical consultations. Video-vignettes designs using APs were found to be valid for investigating medical communication from a patient’s perspective [4, 7]. To ensure ecological validity and thereby external validity of the video-vignettes design, it is important that APs are engaged with the video vignette and video patient. To assess such engagement, we need more understanding of this construct.

The construct of engagement is used in the field of persuasive communication to assess to what extent a reader becomes immersed in a narrative. Narrative engagement is defined as someone’s experience of a narrative [8] and is known to influence the persuasive effect (e.g., on a reader’s beliefs and attitudes) of a narrative [9]. Narrative engagement is a multi-dimensional construct[8, 10]. Although the precise dimensional structure varies across approaches, it embodies concepts such as transportation (the extent to which one becomes absorbed into the story and mentally enters the narrative world [11]), identification (the extent to which one imagines him- or herself to be one of the characters in the text [12]), and telepresence (the extent to which someone has a sense of being present in a virtual environment [13]). For studies using a video-vignette design with APs, this multi-dimensionality of engagement is particularly relevant. For example, whereas some studies may strive to have the APs imagine how they would feel if they would be in the situation of the video patient (‘projection’), others will aim to get APs into the same emotional state as the video-patient (‘empathy’). APs’ ability to project oneself and their ability to empathize might vary per AP and differentially mediate the effect on outcomes such as APs’ level and type of emotional distress evoked by the video vignette.
Two groups of researchers have previously formulated sets of questions to measure narrative engagement. They based their questions mainly on the concepts mentioned above, such as transportation, resulting in partial overlap with regard to item content and dimensions. Yet, both sets of questions are unsuitable for measuring APs’ engagement with video vignettes. First, Buselle and Bilandzic [8] developed and validated a four-dimensional scale to measure narrative engagement. Although this scale is aimed at measuring film and television program viewers’ narrative experiences, it is not apt for measuring APs engagement with the video vignette and video patient, because of its mere focus on narrative processing and understanding. This focus is less relevant for APs viewing video vignettes, because the medical encounters depicted in the vignettes are usually short with an easily recognizable thread and predefined roles of the characters (i.e., a patient and a health care provider). Second, De Graaf and colleagues [9, 10] constructed a set of questions around a hypothesized seven-dimension structure. This set of questions has more relevance with regard to measuring APs’ engagement, because it has a broader scope, encompassing dimensions such as empathy with the main character and adopting the main character’s identity. However, it aims at assessing readers’ engagement with written narratives and therefore it needs adaptation, whereas not all dimensions and questions important for written narratives are relevant when viewing videos [14]. For example, the imagery dimension, i.e., visually imagining the events described (as if one were viewing a video), is irrelevant for videos, as the events are already visualized in the video.

Based on the above, it seems important to develop a multi-dimensional scale to assess APs’ engagement with video vignettes to allow examining the ecological validity of a video-vignettes design, and to enable distinguishing between different dimensions of video-vignette engagement. Therefore, we aimed to first adapt the existing set of questions from De Graaf et al. [9, 10] such that it can be used for analogue patients viewing video vignettes. The resulting questionnaire should include all relevant dimensions of engagement, yet not include an abundance of items. We sought to develop a valid and reliable questionnaire, usable in future video-vignettes studies using APs. Our second aim was to examine the reliability and content validity of the questionnaire when used in video-vignettes designs. Finally, we tested the hypothesized dimensional structure of the resulting questionnaire, thereby also examining construct validity.

METHODS

Questionnaire construction

The development of the Video Engagement Scale (VES) was based on the existing set of 39 questions by De Graaf et al., constructed to assess engagement when reading written narratives [9, 10]. The question set was constructed around a hypothesized seven-factor structure, encompassing: emotions, emotional reactions evoked by the story; attentional focus, attention focused on the story; imagery, imagery of the story; going into a narrative world, the sensation of going into a
narrative world; empathy, empathizing with the main character; identity, adopting the identity of the main character; and adopting the perspective of the character, experiencing the story from the position of the main character. Items were either adopted from existing scales or based on previous definitions of (forms of) engagement [13, 15-17]. The pool of questions was preliminarily validated by De Graaf et al. in three experiments [9, 10]. Exploratory factor analyses showed evidence for a five-factor and four-factor structure respectively, in the different studies.

Based on De Graaf et al.’s validation results [9, 10], two authors (LNCV and MAH) critically reviewed the question set, to make it suitable for video material and concise. Changes were made with respect to the dimensional structure, wording of items, and number of questions. As regards to the dimensional structure, the imagery dimension was removed as it was deemed irrelevant for videos. Adopting the perspective of the character was removed as a separate dimension, as in De Graaf’s research, it strongly overlapped both conceptually and statistically with adopting the identity of the character. Changes to wording included replacing the words ‘story’ and ‘reading’ with ‘video’ and ‘viewing’, respectively. Finally, to shorten the scale, only the items with the highest factor loadings and the least statistical overlap in De Graaf’s studies were selected.

These changes resulted in the 15-item Video Engagement Scale (VES). Responses are made on a 7-point Likert scale (1 = ‘completely disagree’ to 7 = ‘completely agree’). The scale encompasses five proposed dimensions: (1) Emotions (EMO), emotional reactions evoked by the video; (2) Empathy (EMP), empathy with the video-character; (3) Identity (IDE), adopting the video-character’s identity; (4) Attention (ATT), attentional focus on the video, with reduced access to the real world; and (5) Going into a Narrative World (GNW), the sensation of going and being in the narrative world. Three items were included for each dimension. Items were placed in random order. All items and the dimensions to which they belong are displayed in Table 1.

To pilot test the VES, six students participated as APs. After viewing a video vignette of a physician-patient consultation, they completed the questionnaire while thinking out loud [18]. Pilot results confirmed comprehensibility of the questions and conceptual distinction between the different items. The wording of one item was slightly changed to facilitate understanding (i.e., ‘When I watched the video, I was in the world of the video in my imagination’ was changed into ‘When I was watching the video, (…)’).

Reliability and content validity

The VES was psychometrically validated in the context of two video-vignettes studies focused on physician-patient communication using APs. The two studies used different sample populations and different video vignettes, which increases generalizability of the results.
Table 1. Overview of descriptive properties of all items of the VES, including reliability results of items and subscales

<table>
<thead>
<tr>
<th>Item</th>
<th>Content</th>
<th>Dimension</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>During viewing I was fully concentrated on the video</td>
<td>ATT</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skew</td>
<td>Skew</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Item-scale R</td>
<td>Item-scale R</td>
</tr>
<tr>
<td>2</td>
<td>When I was viewing the video, my thoughts were only with the video</td>
<td>ATT</td>
<td>5.32 (1.43)</td>
<td>-0.85</td>
</tr>
<tr>
<td>3</td>
<td>During viewing, I was hardly aware of the space around me</td>
<td>ATT</td>
<td>4.47 (1.68)</td>
<td>-0.44</td>
</tr>
<tr>
<td>4</td>
<td>During viewing it was as if I was present at the events depicted in the video</td>
<td>GNW</td>
<td>4.57 (1.46)</td>
<td>-0.33</td>
</tr>
<tr>
<td>5</td>
<td>After the video was finished, I had the feeling I came back into the ‘real’ world</td>
<td>GNW</td>
<td>4.42 (1.50)</td>
<td>-0.26</td>
</tr>
<tr>
<td>6</td>
<td>When I was viewing the video, I was in the world of the video in my thoughts</td>
<td>GNW</td>
<td>4.68 (1.51)</td>
<td>-0.61</td>
</tr>
<tr>
<td>7</td>
<td>When I had been viewing for a while, it seemed as if I had become the [video character]** in my thoughts</td>
<td>IDE</td>
<td>3.85 (1.46)</td>
<td>0.05</td>
</tr>
<tr>
<td>8</td>
<td>I had the feeling I went through what the [video character]** went through</td>
<td>IDE</td>
<td>3.57 (1.62)</td>
<td>0.22</td>
</tr>
<tr>
<td>9</td>
<td>In my imagination, it was as if I were the [video character]**</td>
<td>IDE</td>
<td>3.62 (1.59)</td>
<td>0.13</td>
</tr>
<tr>
<td>10</td>
<td>The video affected me</td>
<td>EMO</td>
<td>5.24 (1.35)</td>
<td>-0.79</td>
</tr>
<tr>
<td>11</td>
<td>I felt for the [video character]**</td>
<td>EMO</td>
<td>5.01 (1.41)</td>
<td>-0.69</td>
</tr>
<tr>
<td>12</td>
<td>Because of the video, feelings arose in me</td>
<td>EMO</td>
<td>4.93 (1.39)</td>
<td>-0.69</td>
</tr>
</tbody>
</table>

Notes. *ATT = attention, GNW = going into a narrative world, IDE = identification, EMP = empathy, EMO = emotions. **To be specified depending on the video content. In the present validation studies, the video-character was specified as ‘patient’. ***To be specified depending on the video content. Study 1 included the emotion ‘sadness’; study 2 ‘tense’.
Study 1

Study 1 was originally designed to test two methodological issues relevant to research using experimental video vignettes in communication research, i.e., choice of camera perspective and type of introduction to the video. In total, six variations were created of a video depicting a bad-news consultation between an oncological surgeon and a esophageal cancer patient. The VES was completed after video viewing.

Sample & procedure

University students (age 18–40 years), recruited through a psychology and a communication science program, participated as APs. They were randomly assigned to view one of the six variants of the video vignette in a laboratory room. In either variant of the introduction, they were instructed to imagine themselves being in the video-patient’s situation. Directly after viewing, their engagement with the video was assessed using the VES. To assess test-retest reliability, a subset of participants was invited to complete the VES a second time, 24−48 hours after viewing.

Measures

Demographics assessed were participants’ age, gender, education level and ethnicity. Engagement was assessed using the 15-item VES, described above. We assessed how well patients could identify with the video-patient using five items from Cohen’s identification scale [12]. Perceived realism of the video was assessed using three items, asking participants how realistic, credible, and how likely to happen in real life they thought the events in the video were. Perceived realism of the consultation was measured with two questions asking how real, and how similar to a real bad-news consultation the video-vignette consultation was. Finally, credibility of the video-patient was assessed by two items asking about the believability of the video-patient’s behavior and appearance. All items assessing perceived realism, credibility and identification had a 7-point Likert scale (1 = ‘completely disagree’ to 7 = ‘completely agree’). We measured APs’ changes in state anxiety by calculating the difference in scores on the STAI-State short form, assessed before and after viewing the video. The STAI-State short form contains six items (4-point Likert scale; 1 = ‘not at all’, to 4 = ‘a lot’) [19]. Changes in sadness, feeling tense and fearfulness, measured with three single items using visual analogue scale (0–100), were assessed by calculating the difference between scores before and after viewing the video.

Analyses

Unless otherwise reported, all analyses were conducted using SPSS Version 20 [20]. For our analyses, all data were collapsed, i.e., no distinction was made with regard to the video variant viewed by APs. Internal consistency was analyzed for the overall scale and for its subscales, using Cronbach’s Alpha, which was expected to be acceptable (α > 0.70) [21]. Inter-item and item-scale correlations were
calculated. Inter-item correlations between 0.20 and 0.70 [22] and item-scale correlations higher than 0.20 were considered acceptable [23]. Test-retest reliability was assessed by correlating VES test and retest scores. We expected high correlations (r > 0.70) [24]. To assess content validity, we correlated identification with the video-patient, perceived realism of the vignette and the consultation, and credibility of the patient with VES scores. Identification, as a central concept within the multi-dimensional construct of engagement, should correlate positively with VES scores. In previous research, a positive correlation was found between transportation, also a central concept within engagement, and perceived realism of a narrative, its setting and its characters [25]. Therefore, positive correlations were also expected between VES scores and perceived realism and credibility. Moreover, because of the emotional content of the bad news video vignette, we expected stronger engagement to lead to more emotional distress. Therefore we tested whether higher VES scores were correlated with an increase in state anxiety, sadness, feeling tense and fearfulness as a result of viewing the video.

Study 2
Study 2 was originally designed to test the effect of oncologists’ non-verbal communication on patients’ trust. A basic script was created of a consultation between a medical oncologist and a female breast cancer patient. Next, variations in the oncologist’s amount of eye contact, bodily posture and smiling were created. This resulted in eight versions of the video. The VES was completed after viewing the video.

Sample & procedures
Female breast cancer patients and healthy women served as APs. Patients were recruited through radiotherapy out-patient clinics of an academic and a regional hospital, and through advertisements distributed among breast cancer patient organizations. Patients could self-apply by reply card, email or telephone. Participation was from home, via the computer. APs first completed a questionnaire assessing their background characteristics. Next, they viewed a randomly selected video version after being instructed to imagine themselves in the perspective of the video-patient. Afterwards, their engagement in the video was assessed.

Measures
Demographic and medical characteristics comprised age, gender, education level and medical background. Engagement was measured using the newly created VES. Perceived realism was tested using the same three items as in study 1.

Analyses
As in Study 1, data for all different video versions were collapsed for the current analyses. Internal consistency was analyzed for the overall scale and for its subscales (Cronbach’s Alpha). Inter-item
and item-scale correlations were calculated. Inter-item correlations between 0.20 and 0.70 and item-scale correlations higher than 0.20 were considered acceptable. To assess content validity, engagement (VES score) was correlated with perceived realism of the video.

**Dimensionality / construct validity**

Structural Equation Modeling (SEM) was used to investigate the underlying dimensional structure of the questionnaire, using Lavaan software [26]. First, we investigated whether the data supported the hypothesized underlying five-dimensional structure of the questionnaire. To achieve identification of all model parameters, scales and origins of the common factors were established by fixing the factor variances at one.

Goodness-of-fit was evaluated with the $\chi^2$ test of exact fit (CHISQ; significant $\chi^2$ indicates a significant difference between data and model). Root mean square error of approximation (RMSEA; [27, 28]) was used as an approximate fit index (values $> 0.10$ indicate poor fit, $< 0.08$ ‘reasonable’ fit and $< 0.05$ ‘close’ fit) [29].

Modifications to the hypothesized underlying structure were based on inspection of correlation residuals ($> 0.10$) and significant modification indices [30]. Modifications were incorporated if they lead to improvement for both data sets (Study 1 and Study 2), to find a common dimensional structure and thereby improve generalizability of results. Each modification was consistently guided by substantive consideration to retain a theoretical sensible model. $\chi^2$ difference tests (CHISQΔ) were used to evaluate differences between hierarchically related models (significant CHISQΔ indicates a significantly better fit of the more parsimonious model).

The final model provides information about the number of factors required to explain the relationships between items, the strength of the relationships between items and the underlying factors, the strength of the relationship between underlying factors, and the reliability of items.
RESULTS

Reliability and content validity

Study 1
Sample and descriptives
Data of 181 participants were collected (Table 2). There were no missing data, because we used a ‘forced response’ function. Of the 58 APs invited to fill in the retest, 44 completed the questionnaire. Because for two participants retest data could not be linked to the original data, retest data of 42 of the 58 invited participants were available (response rate = 72%). Mean VES score was 4.77 (SD = 1.02; range 1.67–6.87; skewness -0.25; see Table 1). Mean VES score at retest (N = 42) was 4.69 (SD = 1.00; skewness 0.05). Mean score for identification with the patient was 2.84 (SD = 0.89). Mean score for realism of the consultation was 5.03 (SD = 1.16) and for realism of the video was 5.50 (SD = 1.08). Credibility of the patient was on average 4.98 (SD = 1.41). Mean state anxiety increased from 1.67 before the video (SD = 0.47) to 2.09 after the video (SD = 0.57), averaging an increase of 0.42 (SD = 0.59). Mean increases for other emotions were: 19.08 for ‘sadness’ (SD = 24.57), 9.79 for ‘feeling tense’ (SD = 23.87), and 14.71 for ‘fearfulness’ (SD = 22.10).

Reliability
Internal consistency for the VES was high overall (α = 0.93), as well as for four out of five subscales: emotions (α = 0.83), empathy (α = 0.85), identity (α = 0.92), and going into a narrative world (α = 0.82). For attention, consistency was moderate (α = 0.66), due to item 12 (‘During viewing, I was hardly aware of the space around me’). If deleted, internal consistency would increase to an acceptable level (α = 0.75). Item-scale correlations ranged between 0.39 and 0.78 (see Table 1). Inter-item correlations showed an acceptable pattern, mostly ranging between 0.25 and 0.80, with a few exceptions as low as 0.12. Test-retest reliability was high for mean VES scores (r_s = 0.91), and ranged between r_s = 0.77 and 0.89 for the five subscales (Table 1).

Content validity
As hypothesized, we found high correlations between mean VES scores and mean scores for: perceived realism of the video (r_s (181)= 0.50, p < 0.001), perceived realism of the consultation (r_s (181) = 0.44, p < 0.001), and credibility of the patient (r_s (181) = 0.36, p < 0.001). The correlation with identification with the patient scores (r_s (181) = 0.29, p < 0.001) was substantial. Moreover, higher VES scores were associated with increased state anxiety as a result of viewing the video (r_s (181) = 0.27, p < 0.001), as well as with increased sadness (r_s (181) = 0.15, p < 0.05) and fearfulness (r_s (181) = 0.20, p < 0.01). VES scores were not correlated with an increase in feeling tense (r_s (181) = 0.06, p < 0.46).
Chapter 2 | Assessing engagement while viewing video vignettes; validation of the VES

<table>
<thead>
<tr>
<th>Study 2</th>
<th>Sample and descriptives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of the 234 participants, six (3%) had technical problems with viewing the video and were therefore excluded from the analyses. The definitive sample included 228 women (159 (70%) breast cancer patients and 69 (30%) healthy women). Because we used a ‘forced response’ function, there were no missing values. Sample characteristics are displayed in Table 2. Mean VES score was 4.46 (SD = 1.26; range 1.73–7.00; skewness 0.05). For individual VES items, means varied between 3.41 and 6.42 (see Table 1). Mean perceived realism of the video was 5.49 (SD = 1.38).</td>
<td></td>
</tr>
</tbody>
</table>
Reliability
Internal consistency of the VES was high for the scale overall ($\alpha = 0.94$). For the subscales, internal consistency was good: emotions ($\alpha = 0.82$), empathy ($\alpha = 0.82$), identity ($\alpha = 0.91$), going into a narrative world ($\alpha = 0.83$), except for the attention subscale ($\alpha = 0.54$). As in Study 1, deletion of item 12 would increase consistency ($\alpha = 0.68$). Item-scale correlations ranged between 0.26 and 0.79 (Table 1). Inter-item correlations mostly ranged between 0.20 and 0.70, with a few exceptions as low as 0.06 or as high as 0.89.

Content validity
Mean VES score correlated significantly with mean scores for perceived realism of the video ($r_s (228) = 0.29$, $p < 0.001$).

![Hypothesized five-dimensional structure](image)

**Figure 1.** Hypothesized five-dimensional structure
Notes. Circles represent unobserved, latent variables (common and residual factors) and the squares represent the observed variables (item scores). The five latent variables at the top are the common factors ‘attention’ (ATT) measured by items 1, 3 and 12, ‘going into a narrative world’ (GNW) measured by items 2, 4 and 8, ‘identity’ (IDE), measured by items 5, 13 and 14, ‘empathy’ (EMP) measured by items 6, 9 and 11, and ‘emotions’ (EMO) measured by items 7, 10 and 15. Other latent variables are the residual factors that represent all that is specific to item 1, item 2, item 3, etc., plus random error variation.

Dimensionality / construct validity
The hypothesized model (see Figure 1) showed poor model fit on both CHISQ and RMSEA in both studies (Model 1; Table 3). To improve model fit, a cross loading was added of item 5 on GNW (Study 1: CHISQ$\Delta$ (1) = 24.64, $p < 0.001$; Study 2: CHISQ$\Delta$ (1) = 63.83, $p < 0.001$), indicating that the item ‘When I had been viewing for a while, it seemed as if I had become the [video character] in my thoughts’ measured not only identification, but also going into a narrative world. Second,
A residual covariance was added between items 1 and 3 (Study 1: CHISQΔ (1) = 21.23, \( p < 0.001 \); Study 2: CHISQΔ (1) = 70.07, \( p < 0.001 \)). This indicates that the items ‘During viewing I was fully concentrated on the video’ (item 1) and ‘When I was viewing the video, my thoughts were only with the video’ (item 3) have something more in common than what is being measured by the underlying factor attention. Finally, a residual covariance was added between items 6 and 11 (Study 1: CHISQΔ (1) = 13.67, \( p < 0.001 \); Study 2: CHISQΔ (1) = 45.09, \( p < 0.001 \)), indicating that the items ‘I empathized with the [video character]’ (item 6) and ‘I felt for the [video character]’ (item 11) have something more in common than what is being measured by the underlying factor empathy.

Although the overall model fit of this model for both studies was still not completely satisfactory, it no longer indicated poor model fit according to the RMSEA values (Model 4; Table 3). Because no further substantive modifications could be identified to improve model fit for both studies, this model was retained. Subsequently, inspection of parameter estimates indicated that correlations between the common factors EMO and EMP could not be distinguished (e.g., correlations were not significantly different from 1; Study 1: CHISQΔ (1) = 0.51, \( p = 0.48 \); Study 2: CHISQΔ (1) = 0.57, \( p = 0.45 \)). Therefore, the final model consists of a four-dimensional structure, including one cross loading and two residual covariances (see Figure 2). For both studies, the overall fit of the final model (Model 5, Table 3) is still significant according to the CHISQ, but no longer shows poor fit according to the RMSEA (Table 4).

**Table 3.** Goodness of overall model fit of structural equation models to assess construct validity

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CHISQ</td>
<td>df</td>
<td>RMSEA [90% CI]</td>
</tr>
<tr>
<td>Model 1</td>
<td>Hypothesized model (five dimensional structure)</td>
<td>232.34</td>
<td>80</td>
</tr>
<tr>
<td>Model 2</td>
<td>Additional cross loading item 5</td>
<td>207.70</td>
<td>79</td>
</tr>
<tr>
<td>Model 3</td>
<td>Additional residual covariance item 1–item 3</td>
<td>186.47</td>
<td>78</td>
</tr>
<tr>
<td>Model 4</td>
<td>Additional residual covariance item 6–item 11</td>
<td>172.80</td>
<td>77</td>
</tr>
<tr>
<td>Model 5</td>
<td>Merged factors ‘empathy’ and ‘emotions’</td>
<td>188.80</td>
<td>81</td>
</tr>
</tbody>
</table>
Table 4. Standardized parameter estimates of the Final Model (model 5)

**Study 1**

*Factor loadings*

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>3</th>
<th>12</th>
<th>2</th>
<th>4</th>
<th>8</th>
<th>5</th>
<th>13</th>
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<th>11</th>
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<tbody>
<tr>
<td>ATT</td>
<td>.56</td>
<td>.47</td>
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<tr>
<td>GNW</td>
<td></td>
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<td>.89</td>
<td>.59</td>
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*Residual variances*

.68 .78 .55 .21 .65 .24 .20 .23 .14 .46 .32 .30 .16 .30 .62

*Common factor correlations*

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**Study 2**

*Factor loadings*

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*Residual variances*

.89 .92 .29 .43 .37 .30 .26 .14 .09 .52 .29 .51 .31 .21 .61

*Common factor correlations*

<table>
<thead>
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<th>ATT</th>
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**Notes.** ATT = attention, GNW = going into a narrative world, IDE = identification, EMP/EMO = empathy/emotions. Standardized factor loadings can be interpreted as the correlation between the item and the underlying factor (i.e., dimension). Standardized residual variances can be interpreted as the proportion of unexplained variance. Standardized common factor correlations can be interpreted as correlations between the common factors (i.e., the dimensions).
**DISCUSSION**

Discussion

We developed and validated the 15-item, multi-dimensional Video Engagement Scale (VES) to assess APs’ engagement with video vignettes. The VES enables researchers to ensure the ecological validity of a video-vignettes design, and to distinguish between different dimensions of video-vignette engagement. Thus far, a specific scale to assess APs’ engagement with video vignettes did not exist. As a result, researchers had limited insight in APs’ engagement, because it was either not assessed at all, or using single, unvalidated items.

Results from two studies indicate that the VES assesses engagement reliably, as indicated by high internal consistency and test-retest reliability. Although reliability of most subscales was high, we found lower internal consistency for the attention dimension. This was due to Item 12 in both studies. Item 12 reads: “During viewing, I was hardly aware of the space around me”. Possibly, it focuses more on the space surrounding the participant, whereas the other items in this dimension focus on the video. For participants, to devote their full attention to the video might not necessarily imply that they forget their surroundings. In other settings, e.g. with more prominent and large
screens, this may be the case. However, in laboratory settings such as in the present studies, this presumably should not be expected.

Satisfactory content validity was indicated by substantial correlation between the VES and identification with the video-patient, and high correlations between the VES and perceived realism of the video and consultation, and credibility of the video-patient. Moreover, as expected, high correlations were found between the VES and anxiety, sadness and fearfulness provoked by viewing a distressing patient-provider interaction.

Dimensionality testing suggested a four-dimensional model fit, largely resembling our hypothesized five-dimensional model. The hypothesized dimensions emotion and empathy were combined to one dimension. Empathizing with the video-patient seems to go jointly with experiencing emotions, most likely those modeled by the patient in the video [31]. Scores on this combined scale were higher than on the identification dimension. Possibly, APs more easily empathize with the video-patient and experience the modeled emotions, than they project themselves in the role of the video-patient and experience what they themselves would feel in that situation. This is an important realization for the video-vignettes methodology, because it suggests that APs’ emotions when viewing the video may be largely restricted to the ones displayed by the video-patient. More research is needed to investigate these issues.

Future research should further test the four-dimensional model of engagement resulting from our analyses. For now, researchers can tentatively use scores on separate dimensions to distinguish between different types of engagement. Further confirmation of the scale’s dimensional structure will ensure an even richer understanding of APs’ experiences of video vignettes. Furthermore, future research could be aimed at shortening the scale to further improve on it. At present, there is insufficient evidence to eliminate any items from the scale. Reliability scores and structural equation modeling results from the current study could be examined in future research to select the items with the best fit. Next, the resulting shortened scale would need to be empirically validated before use. Until then, use of the 15-item scale is most appropriate.

Conclusion

In conclusion, we developed and validated a 15-item scale to assess video-vignette viewers’ engagement. Results from two studies show that the VES reliably and validly measures APs’ engagement in health communication research using video vignettes. First, the VES can be employed to assess the validity of this kind of research and it therefore contributes to the rigor of future video-vignette studies. Second, the VES enables distinguishing between different types of engagement, but this should happen cautiously for now. Further testing of the scale is needed to more solidly establish its dimensionality.
Chapter 2 | Assessing engagement while viewing video vignettes; validation of the VES

Practice Implications
Results from two studies suggest that the VES allows adequate general assessment of APs’ engagement with a video vignette. We recommend applying the VES in future video-vignette studies, to verify if APs are sufficiently immersed in the video vignette(s) used, thereby ensuring validity of the study design. The 15-item VES is added as an supplement (Supplement A).

AUTHOR DISCLOSURES

Conflict of interest
None.

Funding
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Acknowledgements
We would like to thank all participants for their commitment. We would also like to thank Valerie Alhamad, Maud Nooitgedagt, Anne Kimman and Daniëlle Vermeulen for their help with data collection and data management.
REFERENCES


Chapter 2 | Assessing engagement while viewing video vignettes; validation of the VES


SUPPLEMENT A

VES® Video Engagement Scale

* L. Visser, M. Hillen, M. Verdam, N. Bol, H. de Haes, E. Smets

Instructions:

With the following statements we would like to get an idea of how engaged you were with the video while you were viewing it.

Please indicate how much you agree with the following statements. There are no right or wrong answers. You can place an ‘X’ in the box that represents your opinion the best.

If you completely disagree with the statement, you can place an ‘X’ in the extreme left box. The more you agree with the statement, the more you can place an ‘X’ in the direction of the extreme right box.

<table>
<thead>
<tr>
<th>Completely disagree</th>
<th>Completely agree</th>
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<td>1 2 3 4 5 6 7</td>
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1. During viewing I was fully concentrated on the video
2. During viewing it was as if I was present at the events depicted in the video
3. When I was viewing the video, my thoughts were only with the video
4. After the video was finished, I had the feeling I came back into the ‘real’ world
5. When I had been viewing for a while, it seemed as if I had become the [video character]* in my thoughts
6. I empathized with the [video character]*
7. The video affected me
8. When I was viewing the video, I was in the world of the video in my thoughts
9. During viewing, I felt [particular emotion]* when the [video character]* felt [particular emotion]*
10. I found the video moving
11. I felt for the [video character]*
12. During viewing, I was hardly aware of the space around me
13. I had the feeling I went through what the [video character]* went through
14. In my imagination, it was as if I were the [video character]*
15. Because of the video, feelings arose in me

Notes: *To be specified depending on the video content. The VES total score can be calculated by adding up scores on the 15 individual items. The VES is copyrighted on the names of the authors.

For academic use, the VES is available with no charges under the condition that investigators may be requested to share their results with the authors so that reliability and validity testing can proceed appropriately. A Dutch version is also available upon request.