# Identifying Pertinent Aspects of Informative Videos that Indicate Objectivity

SUBMITTED IN PARTIAL FULLFILLMENT FOR THE DEGREE OF MASTER OF SCIENCE

Helen Blankers
11140291

MASTER INFORMATION STUDIES
HUMAN-CENTERED MULTIMEDIA

FACULTY OF SCIENCE
UNIVERSITY OF AMSTERDAM

July 21, 2017

*1st Supervisor*
*Prof. Dr. Lynda Hardman*
*CWI*

*2nd Supervisor*
*Dr. Frank Nack*
*UvA*

# Is Seeing Believing?
# Identifying Aspects of Informative Videos that Indicate Objectivity

**Helen Boots-Blankers**
Student number: 11140291
University of Amsterdam, Netherlands
Helen.Blankers@student.uva.nl

## ABSTRACT

Information in online videos can be misleading and unreliable. Video users tend to select videos with misleading information [11]. To facilitate video users in their selection of videos they need an objectivity measure [26]. We propose thirteen aspects of video that contribute to the measure of its objectivity. We ranked the aspects according to their contribution to the objectivity measurement. Spoken content, vocabulary use, title, knowledge of the actor on the subject and facial expressions are the five most prominent contributors. The measurement of objectivity in videos was explored across the three persuasion dimensions: 1) ethos, 2) pathos, 3) logos [4]. Expert opinions on which aspects can be used for video objectivity measurement were solicited. A user survey was carried out to assess the degree to which these aspects contribute to measuring the objectivity.

## ACM Classification Keywords

H.5.m. Information Interfaces and Presentation : Miscellaneous

## Author Keywords

Information access; Video analysis; Persuasive appeal; Ranking; Objectivity Measure; Credible; Truthful; User-generated content.

## INTRODUCTION AND MOTIVATION

> 'When the facts change, I change my mind. What do you do, sir?' *John Maynard Keynes*

Nowadays, a myriad of videos is available online. However, the quality of the information provided is not guaranteed. The use of online video is growing fast. In 2016, 60% of the total global mobile data traffic was due to video, in 2020, this is predicted to be over 75% [12]. These figures mean that online video is becoming an increasing information source.

As online videos can be misleading and unreliable sources of information, the growing dependence on this resource can lead to unhealthy and dangerous situations regarding topics such as healthcare or safety [11, 23]. As the volume of available video information increases, the need for an objectivity measure to discriminate between true and misleading information for videos becomes indispensable [22].

Potential viewers want to be informed about the objectivity of videos, so they can make an informed decision on which videos to watch [26]. To use the words of Gardner et al.(1999, p.44): '...they need to be able to distinguish the genuine from the bogus...'[15]. The information seeker bases her/his choice for the use of an online source on the perceived credibility or objectivity of that online source [20, 26].

Annotations describing the content can support the information seeker in choosing the most useful information with the highest objectivity [26]. Traditionally, information quality research has been focused on textual information [25, 32]. However, a systematic understanding of how video properties (content and context) contribute to video objectivity is lacking. Video objectivity measurement can play an important role in addressing the issue of misleading video information.

We identify factors that determine objectivity in a video and how these can be matched to identifiable aspects of a video. The aim of this research is to determine whether an objectivity measure for videos can be provided.

To this end, two research questions were formulated:

1. *Which aspects of an informative video indicate its level of objectivity?*
2. *Which video aspects contribute most to the level of perceived objectivity of an informative video?*

## RELATED WORK

There are different ways in which you can define objectivity. Leonard et al. (1979) argue that 'the belief in objectivity is a faith in facts, distrust in values, and a commitment to their segregation', and Reiss et al. (2016) define objectivity as 'factual, value-free and free from personal biases' [30]. Value-freedom is further differentiated by Lacey (2002) in impartiality (contextual values do not influence the choice of theory), neutrality (the statements are value free) and autonomy (the motive is

| Nr | Objectivity Element | Video Aspect | Cues (examples) | Reference |
|---|---|---|---|---|
| 1 | Factual & truthful | Spoken content | Argumentation, errors in the information | [8, 14, 15] |
| 2 | Factual & truthful | Vocabulary use | Characteristic phrases and words, passive voice | [13] |
| 3 | Factual & truthful | Title | Value free | [15] |
| 4 | Factual & truthful | Date of publication[1] | Recency | [15] |
| 5 | Factual & truthful | YouTube category[1] | Relevancy | [15] |
| 6 | Factual & truthful | Facial expressions | Fear, distress, disgust | [2, 18] |
| 7 | Factual & truthful | Body language | Head movements, posture | [2, 10, 17, 24] |
| 8 | Credible | Knowledge on the subject | Education, employer | [14, 15] |
| 9 | Credible | Vocal inflections | Pitch, loudness | [10, 16] |
| 10 | Credible | Physical appearance | Clothing | [26, 29] |
| 11 | Neutral | Type of scene | Monologue, interview, discussion | [26] |
| 12 | Neutral | Personal beliefs and values of the actors | Ideology, upbringing, experiences | [15, 26] |
| 13 | Neutral | Publisher | Reputation, popularity | [15, 26] |
| 14 | Neutral | Production intent category | Informative, education, entertainment | [27, 28, 31] |
| 15 | Neutral | Governmental influence[1] | Country of production | [1] |

Table 1. Video aspects matched to objectivity elements

[1] Not used in the user survey as a result of low rating in expert survey (Figure 4)

| Nr | Video Title | Publisher | URL | Fragment | Views (6-5-17) | Persuasive appeal |
|---|---|---|---|---|---|---|
| 1 | Interview With Kamal Patel of Examine.com - Aspartame | Jeff Nippard | youtu.be/LgATl0YdGvQ | 1:06:12-1:07:13 | 6,740 | Logos |
| 2 | Facts Natural News Got Wrong About Aspartame [1] | Myles Power | youtu.be/XpmQRHq4qmQ | 2:23-3:24 | 26,508 | Logos |
| 3 | The Dangers of Aspartame - Aspartame | HealthRanger7 | youtu.be/pvFRLIjOLOU | 2:59-3:49 | 842,943 | Ethos |
| 4 | How The Body Metabolizes Aspartame | Dr. James Meschino | youtu.be/79G85bSePwc | 2:21-3:33 | 2,642 | Ethos |
| 5 | The Truth About Cancer A Global Quest Episode 4 - Aspartame | infinityBBC | youtu.be/gnwEO6e6XDQ | 2:28-3:21 | 16,844 | Pathos |
| 6 | Aspartame Killed My Wife - One Mans Story | Mike Hanson | youtu.be/_rJ1jpr5c4Y | 7:57-9:06 | 109,088 | Pathos |

Table 2. Videos used in surveys

[1] Not used in the user survey to shorten the length of the survey.

the desire to increase knowledge) [21, 30]. Based on the last two definitions we identify video aspects that can contain cues on the objectivity elements 'factual', 'credible' and 'neutral'.

According to Aristotelian reasoning, three factors affect the persuasive appeal: the aspects of the message, these are the logos (logical arguments) and pathos (emotions) aspects of the video, and the aspects of the communicator, referred to as ethos (source credibility) [4]. We propose to use the logos, ethos and pathos components of persuasive appeal along which we can verify video information for its objectivity.

**Persuasive aspects of logical arguments - Logos**
Logical appeal is commonly used to make arguments [8]. The actor in the video provides factual information and arguments to support her/his position on an issue. The more factual information provided to underpin the claims, the more objective the information, unless the factual information is intentionally used to create an incorrect image of reality (in the case that the actor is lying). Therefore, we define the logos component

of objectivity with the terms 'factual[1]' (the information given in the video is correct) and 'truthful[2]' (the information given in the video is honest and not deliberately false).

The argumentation in the spoken content (Table 1, row 1) allows the viewer to evaluate the argument and decide whether to accept the information as valid [8, 15]. The level of persuasion is also enhanced by a simple presentation of the facts [14]. The linguistic features in the vocabulary use (Table 1, row 2) can discriminate between true and false statements. For example, passive voice may be strategically used to edit or conceal information [13]. Other potential indicators of (the lack of) factual information are the presence of errors in the information, the mention of sources, the recency of the information and the title, date of publication and the YouTube category of the video (Table 1, rows 3-5)[15].

_____

[1] In the expert survey the term 'faithfulness to facts' was used.
[2] In the expert survey the term 'truthfulness' was used.

The intention of the communication determines the communicative effect [6]. Intentional untruthfulness as in the case of deception and lying undermines the communication [33]. Facial expressions and body language can indicate (un)truthful communication (Table 1, rows 6,7) [2, 18]. The combination of the use of certain postures and gestures are related to the sincerity, truthfulness and effectiveness of the communication [10, 17, 24].

### Persuasive aspects of source credibility - Ethos
We define **source credibility** as: the actor has the quality of being trusted and believed in by others.

The main components of source credibility are the actor's expertise on the subject (the extent to which the viewer perceives the actor as being qualified) and trustworthiness (the degree to which the viewer sees the actor's statements as valid) (Table 1, row 8) [14, 15]. Cues for the expertise can be the education of the actors (if they are well known), titles of the actors or information on their employer. These cues can be used to establish the credentials of the actors [15]. The persuasive effect also varies with the vocal inflexions and appearance of the actor in the video, for example, the more attractive the actor, the more the viewer tends to believe what s/he says (Table 1, rows 9,10) [10, 16, 26, 29].

### Persuasive aspects of emotional appeal - Pathos
In contrast to the ethos and logos persuasion aspects, we state that the use of pathos persuasive appeal does not increase objectivity. Examples of the pathos appeal are humour and compassion, inducing feelings such as joy, anxiety and anger. This kind of emotional appeal prevents an impartial and neutral message. As defined by Lacey (2002), objectivity incorporates 'impartiality', 'neutrality' and 'autonomy' [21]. To express pathos as an objectivity component, we use the term 'neutral [3]' because it is an antonym of emotional. We define neutral as 'the video shows multiple perspectives attributable to not being involved'.

The presentation of the information, the type of scene, can provide useful information on the level of neutrality (Table 1, row 11). Cues for the objectivity level of the type of scene can be whether several people are exchanging ideas (discussion) which give multiple points of view on the issue, or whether one person is presenting his/her point of view (monologue) [26].

The personal beliefs and values of the actors in the video (e.g. ideology, upbringing, experiences) also influence their communication and thus the viewer (Table 1, row 12). Additionally, the reputation and/or popularity of the publisher can provide information on the objectivity level of the video (Table 1, row 13) [15, 26]. A publisher that is well known for her/his point of view will less likely use her/his publication channel for neutral messages.

The way a video is produced (e.g. shot, edited), reflects the producers intent and this also influences the viewer's perception of objectivity (Table 1, row 14) [31]. A documentary, for example, is believed to be more objective than a narrative

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[3]In the expert survey the term 'neutrality' was used.

[8]. The level of persuasion can also increase with the use of jerky character motion (abrupt reframing, rapid cuts, and actors' idiosyncratic movement) [27]. Rabiger (2001) advocates transparency of the production process: '...the more the public understands how a story is constructed, the more likely they are to ascribe fairness to it'[28]. Thus, transparency of the production process affects the viewer's perception of the objectivity of the video.

A final aspect that can influence the objectivity of a video is the governmental control or censorship in the country of production and/or publication; certain governments use digital censorship (Table 1, row 15) [1].

All in all, we found fifteen video aspects that can contain information on the level of objectivity (Table 1). To assess which aspects can be used for video objectivity measurement we consult experts.

## EXPERT SURVEY
The aim of the expert survey was to assess the completeness and necessity of the video aspects identified in Table 1.

### Measurement
We used a seven-point Likert scale which enables experts to express how strongly they feel a particular video aspect influences the video objectivity: fully disagree, disagree, partly disagree, neutral, partly agree, agree and fully agree. The optimal number of response alternatives for a scale is centred at seven, allowing for a neutral response with the odd number of alternatives [19]. An open question was used to collect other aspects that can indicate objectivity.

We measured the videos' objectivity with a sliding scale from -30 (very untruthful/unfaithful to facts/incredible/biased) to +30 (very truthful/faithful to facts/credible/biased). The middle position of the slider indicated 'I don't know'. The sliding scale provides a sufficient breadth of answers and thus a more accurate reading of the range that the experts feel best represents their opinion.

### Method
Questionnaires are more cost- and time-efficient than structured interviews. Other arguments for the use of the questionnaire are the absence of interviewer effects and the convenience for the respondents [9, p.222]. We used an online questionnaire to solicit experts' opinion on the importance of video aspects to measure the objectivity of videos.

*Questionnaire*
The questionnaire was self-administered and qualitative oriented. We asked the participants to watch six YouTube video fragments of approximately 1-minute length on the subject of the relationship between aspartame and health issues (Figures 1, 2, 3). Aspect 1-7 were assessed on their influence on the level a video is factual, and a video is truthful, aspects 8-11 were assessed on their influence on the level a video is neutral and aspects 12-15 were assessed on their influence on the level a video is credible (Table 1). The experts could also indicate if other aspects needed to be taken into account. In the second part of the survey, the experts were asked to choose to what

Video 1: interview with researcher Patel     Video 2: Chemist Myles Power

**Figure 1. Videos with logos appeal**


Video 3: researcher Dr. Olney     Video 4: Dr. Meschino

**Figure 2. Videos with ethos appeal**

degree each video was factual, truthful, credible and neutral respectively.

*Participants*
We invited 16 experts from the fields of communication, behavioural science, movie and video education and journalism personally through e-mail and in person to participate in the expert survey. Seven experts participated between April 17th and April 25th, 2017.

*Videos*
The videos fragments are intended to demonstrate different levels of objectivity. All videos are in English and subtitled in Dutch as English and Dutch speaking experts were invited. Three of the videos contain arguments for aspartame being harmful to health, and the other three argue that there is no proof that aspartame is harmful to your health. Each video approaches the issue from one of the three persuasive appeal perspectives.

- Logos - Factual & truthful
  In video 1, an explanation of the results of studies performed on aspartame is given by Kamal Patel. Patel is the director of Examine.com, a company that reviews nutrition studies using evidence-based practice methodology. Patel comments on the reliability and validity of the studies on aspartame (Figure 1).


Video 5: hospital care     Video 6: widower Dodge

**Figure 3. Videos with pathos appeal**

The second video features Myles Power, a chemist who exploits an educational YouTube channel where he discusses pseudoscience theories. Myles reacts to the arguments another YouTube source gives for the supposed dangers of aspartame. For each argument, Myles explains the chemistry process to show why the argument is not valid (Figure 1).

- Ethos - Credible
  In video 3, Healthranger7 published a news item produced by Fox5 News. A journalist from Fox5 News interviews a university researcher (Dr Olney) in a white laboratory coat in a laboratory setting. The reporter addresses the researcher with his title and presents him as an expert on aspartame research. The white laboratory coat and the laboratory setting are ethos appeals (Figure 2).

  Dr James Meschino published the fourth video. He exploits the 'Meschino health' YouTube channel. Meschino is wearing a white doctor's coat and seems to be standing in a high-tech medical clinic. Again, the white coat and medical facility setting are ethos appeals (Figure 2).

- Pathos - Emotional
  In the fifth video, a Dutch neuropsychologist tells about his distrust in the government supervision. We see images of a hospital bed and a woman's hand holding and caressing the hand of a patient. The emotions provoked in this video are doubt and distrust

  In the sixth video, an elderly widower Mister Dodge is interviewed. He believes aspartame caused his wife's death. The emotions provoked in this video are sadness, anxiety and anger. (Figure 3).

**Results**
Two aspects scored below neutral on the seven-point scale for emotional appeal (Figure 4), these are the aspects 'date of publication', and 'YouTube category'. According to the experts, these aspects do not influence the judgment on the objectivity of the videos'. An explanation for these ratings can be that the 'YouTube category' is chosen by the person who uploads the video and the 'date of publication' provides no information on the creation date and thus timeliness of the video. The other aspects scored above neutral (> four points). For each aspect, the mean score for the aggregated participants was calculated. Aspects 1-7 were scored twice, on being factual and being truthful. We aggregated these scores per aspect and show the mean score per aspect in Figure 4. The aspect 'governmental influence' is ranked 11th on the list. Although considered important, no information on this aspect is available in the videos we used.

We decided not to use 'date of publication', 'YouTube category' and 'governmental influence' in the user survey; these aspects are greyed out in Table 1.

The experts suggested to add the following indicators to the list:

- Age and clothing of the actors (n=3).
- Editing, camera position and shots (n=2).

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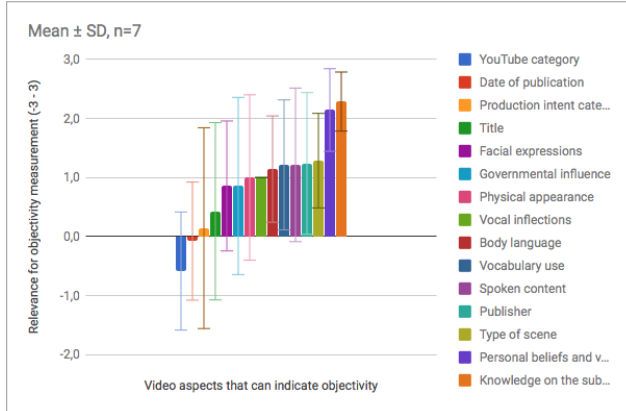| Objectivity Element | Video Aspect | Source | Cues (examples) | Reference |
|---|---|---|---|---|
| Neutral | Production settings | Nonverbal | Surroundings, camera position, lightning, editing | [28, 31] |

**Table 3. Result expert survey**



**Figure 4. Expert ranking of the importance of aspects (Likert scale -3 - 3)**



**Figure 5. User survey participants: Age and gender distribution**

The age and clothing of the actors are part of the physical appearance aspect hence we clarified this aspect with an example (e.g. clothing). We added the editing, camera position and shots as the video aspect 'production settings' (Table 3). The importance of the aspect 'production settings' is confirmed by Patel et al. (2014), who concluded that producers who deliberately use jerky motions in their videos increase the level of persuasion of the video [27].

Altogether, in the next section, we will evaluate thirteen aspects on their contribution to the objectivity measurement of videos. Twelve aspects from Table 1 and the added aspect from Table 3.

### Discussion and limitations
In the expert survey the aspects were divided into groups based on the terms neutral, credible, factual and truthful. It can be argued that this classification is debatable. The choice was based on the source of the cues, for example voice intonation and intensity can influence perceived credibility [16] however it can also be argued that the vocal inflections carry emotions and should be categorized with the 'neutral' objectivity elements. Nevertheless, this should not have influenced the results of this study since the classification is used as a tool to facilitate the understanding of the concept objectivity. In the user survey, the aspects are not divided in the subterms for objectivity.

We asked professionals in communication, journalism, behaviour studies and film studies for their opinion. Even though they are considered to be experts in the field, opinions are a subjective measure and can differ between experts. Therefore, the results of the expert survey could be greatly influenced by the sample of experts that joined the study. These experts may be wrong about what they think of the indicators, other experts may have other opinions. In some sense this doesn't matter, we 'collected' aspects which we use in the user study
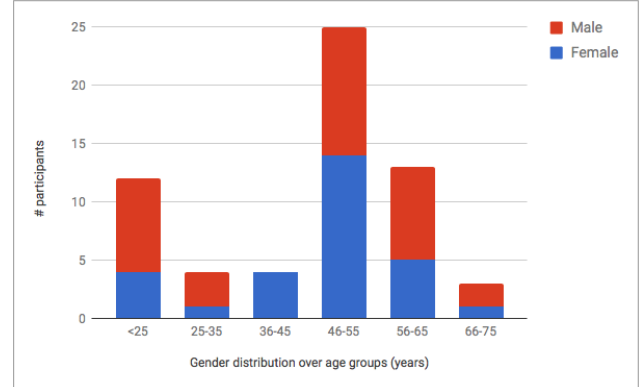
to assess the degree to which these aspects contribute to the objectivity measuring.

### USER SURVEY
Humans possess the ability to infer the intent of other humans by their gestures and expressions, and therefore users should be able to grade the level of objectivity of a video [7]. To determine which of the thirteen aspects contribute most to the level of objectivity of a video, a user survey was conducted.

### Measurement
To obtain the relative objectivity order for the videos we used a drag and drop scaling question. The ratings requested for the individual aspects were on a five-point Likert scale (very subjective, partially subjective, subjective nor objective, partially objective, very objective). A five-point scale appears to be less confusing and to increase the response rate (compared to a seven-point scale) [5]. With this scale, we measured the evaluation of objectivity on the aspect in question for each of the videos on aspartame. The participants could also choose 'no opinion' to avoid forcing an answer when the participants judged the question could not be answered. For the measure of the objectivity of the individual video, we used the same sliding scale as we used in the expert survey.

### Method
To collect data from internet users, we conducted an online user survey with a quantitative approach and convenience sampling. The benefits of this approach are that it is time and cost-efficient.

*Questionnaire*
The questionnaire consisted of 18 questions and five videos. We used videos 1, 3, 4, 5 and 6 from Table 2. To limit the length of the survey, we excluded video 2 (Myles Power, Figure 1) from the survey. The persuasive appeal used in this video is similar to that of video 1 (Jeff Nippard).
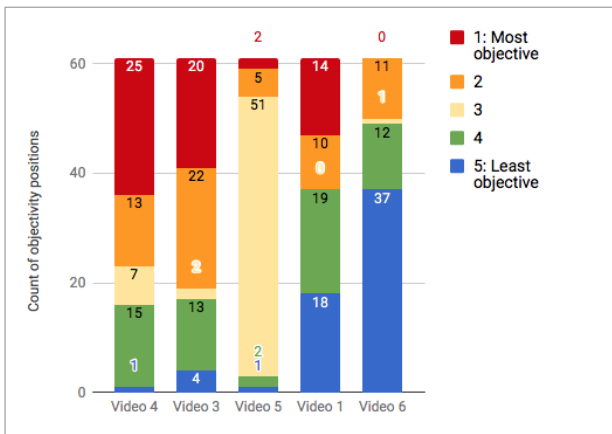
5

**Figure 6. User survey: Relative objectivity ranking of the videos (weighted average) from most objective (far left) to least objective (far right)**
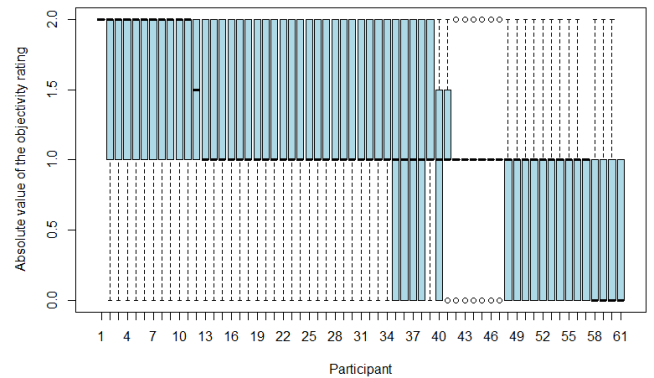


**Figure 7. User survey: Median of the absolute objectivity value per participant over 13 aspects and 5 videos. Whisker plot with median, 25th and 75th percentiles and min/max per participant (n = 61)**
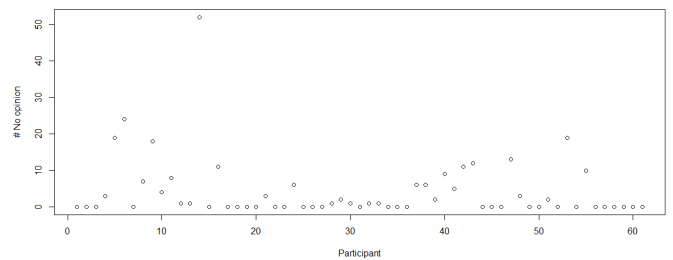
In the first question, participants ranked the videos in perceived objectivity order. Therefore, the participants were not yet primed to think about the different aspects concerning objectivity in a video. Subsequently, the participants rated the level of objectivity for each video on a sliding scale from -30 (very subjective) to +30 (very objective). We provided a clear operational definition of objective [4] and subjective [5] videos to avoid confusion on the terms. The participants also rated the level of objectivity for the 13 aspects for each video.

*Procedure*
Participants were invited through social media and e-mail. The survey was online for 22 days from May 14th to June 5th, 2017.

*Participants*
61 of 183 participants completed the survey. We used the data from the 61 participants who completed the survey. These 61 participants needed on average 20 minutes to finish. Of the 61 participants, 28 were male and 33 female. Most of the participants were between 46 and 65 years old (Figure 5). 26 participants had a college education, 23 participants had a higher professional education, five participants had a secondary vocational education, and seven participants had a primary education.

**Results**
*Participants Profile Across Videos and Aspects*
Participants differ in their certainty levels. One participant always scored the extreme answer for each aspect (Figure 7, participant 1). The results of this participant were not removed from this study because although always on the extreme; the aspects were rated differently on the objective scale. Participants 42 - 48 rated most aspects with 'partially objective' or 'partially subjective'. The few times these participants gave an extreme score on an aspect the aspect was probably very



**Figure 8. User survey: Total count of 'no opinion' per participant over 13 aspects and 5 videos (n = 61)**



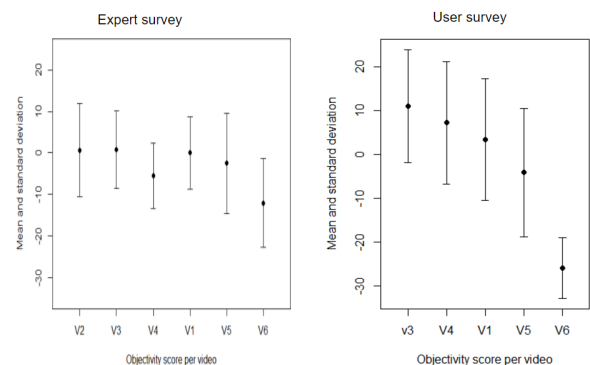**Figure 9. Video objectivity rating: mean and SD (sliding scale (-30,30). LEFT: Expert rating (n=7), RIGHT: User rating (n=61).**

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[4] An objective video is limited to facts, observations and findings, without being influenced by individual feelings or prejudices.

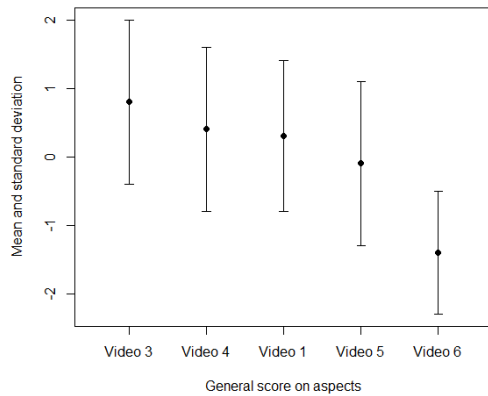[5] A subjective video is influenced by personal opinions, interests or ideas.

6

**Figure 10. User survey: Mean and SD of the aggregated aspects per video (Likert scale -2 - 2)**

significant to the objectivity score of the video. They rated five aspects more than seven times the extreme score (the aspect with the highest number of extreme scores first): spoken content, title, vocabulary use, facial expressions and production intent.

The answers to the question 'To what degree is this aspect subjective or objective in this video' were converted to numbers, 'very subjective' = -2, 'subjective' = -1, 'subjective nor objective' = 0, 'objective' = 1 and 'very objective' = 2. Figure 7 visualises the total of the absolute numbers for each participant in a whisker plot, the whiskers extending to 1,5 of the interquartile range. Any data point beyond that distance shows as an outlier. Figure 8 shows the number of times each participant chose the answer 'no opinion'.

*Video Objectivity Ranking and Video Objectivity Rating*

| Video rank | Relative objectivity (Figure 6) | Continuous scale -30/+30 (± SD)(Figure 9) | Aspects Likert scale -2/+2 (± SD) (Figure 10) |
|---|---|---|---|
| 1 | Video 4 | Video 3 (11±13) | Video 3 (0,8±1,2) |
| 2 | Video 3 | Video 4 (7±14) | Video 4 (0,4±1,2) |
| 3 | Video 5 | Video 1 (3±14) | Video 1 (0,3±1,1) |
| 4 | Video 1 | Video 5 (-4±15) | Video 5 (-0,1±1,2) |
| 5 | Video 6 | Video 6 (-26±7) | Video 6 (-1,4±0,9) |

**Table 4. Video objectivity measured in user survey: relative objectivity ranking, mean objectivity score per video (continuous scale) and mean objectivity sore of the aspects per video (Likert scale -2 -2, n = 61, rank 1 = most objective)**

In the initial ordering of the videos on objectivity level, video four ranked as the most objective (Figure 6, n=25). Subsequently, the objectivity ordering is video three, five, one and six, based on weighted average (Table 4, left).

Participants rated video three individually as the most objective on a continuous scale (Table 4, middle), this video also scored the highest objectivity mean value on the aspects (Table 4, right).

Participants chose video five initially almost unanimously as the 'video in the middle'. On the continuous scale and with the use of the individual aspects, video five scored less objective (from rank three to rank four). Although video five has a high pathos appeal, the logos and ethos appeal are also used in this video. The setting is an interview, the actors are representative men, and the interviewee has an academic title and mentions research that should prove that aspartame is dangerous to your health. We believe the extensive use of multiple types of appeal in this video could explain why the users initially judged this video as more objective than video number one. As users became familiar with the aspects that can indicate the objectivity level, they judged video five less objective than video number one.

The most subjective video is chosen with the most certainty, 61% of the participants evaluated video six as the most subjective, with a mean value of -26 on a scale from -30 to +30 and a standard deviation (SD) of seven (Figure 9, right). Videos one, four and three scored positive on the objectivity rating, but the difference in their mean value is small (Table 4, middle). The mean objectivity rating of videos three, four, one and five have a high standard deviation (Figure 9, right).

The objectivity rating did not differ significantly between the different age groups. An ANOVA comparing the continuous video ratings for five videos among the six age groups (Figure 5) revealed no significant p-values (V1: $F_{(5.55)} = 1.085$, P = 0.379, V3: $F_{(5.55)} = 0.529$, P = 0.753, V4: $F_{(5.55)} = 1,117$, P = 0.362, V5: $F_{(5.55)} = 1.686$, P=0.153, V6: $F_{(5.55)} = 1.611$, P=0.173).

Gender did not have a significant effect on the objectivity rating for videos one, three, four and five. We performed an independent sample T-test (V1: $F_{(59)} = 0.973$, P=0.431, V3: $F_{(59)} = 0.900$, P=0.372, V4: $F_{(59)} = -0.599$, P=0.551, V5: $F_{(59)} = 1.061$, P=0.293). Video six was non normally distributed subsequently we could not perform the independent sample T-test for video six.

*The Level of Consensus on Video Objectivity*
For the most subjective video (video 6, Figure 3), the interquartile ranges for the aspects are lower than those of the other videos (Figure 12). These results suggest there is more consensus on the objectivity level if the video is more subjective. For the other videos, the data are more spread out from the median (Figure 12).

*Relevance and Usefulness of the Video Aspects*
Comparing the overall subjectivity rating of the videos to the aggregated objectivity scores of the individual aspects of the videos the objectivity ranking of the videos doesn't change (Table 4, middle and left). These results suggest that the used aspects can indicate the level of objectivity of the videos.

With the Likert scale, we measure how strongly the participants feel about each of the video aspects concerning the level of objectivity of the video (Figure 10). The stronger the opinion of the participants on an aspect; the more important this aspect is for the objectivity rating.
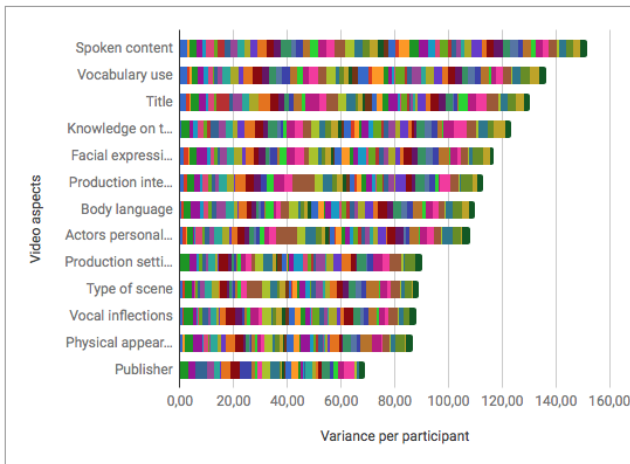
Figure 11. User survey: Aggregated variance per aspects of all participants (n = 61)



Figure 12. User survey: Objectivity rating per aspect per video, with median, 25th and 75th percentiles and range

Some aspects are easier to form an opinion on than others. The 'publisher' was the hardest aspect of judging, 23% of the participants had no opinion on this aspect (Figure 8). This can be explained by the lack of information on this aspect. The participants did not know the names and reputations of the publishers from the used the videos. Other aspects were less hard to judge, few participants had no opinion on 'spoken content'(1%), 'vocabulary use' (1.6%) and 'facial expressions' (2%).

The opinion on the objectivity of an individual video varied for the individual aspects (Figure 12). Most aspects show the maximum breadth of five. Videos three and six, the most and least objective videos, show less breadth on the 'knowledge on the subject' aspect which is an indicator of credibility. These findings are in line with those of English et al. (2011) who found that the actor's expertise and trustworthiness have the highest appeal to the video users [14]. The median and variability of the aspects are visualised in a whisker plot for each video (Figure 12), the whiskers extending to 1.5 of the interquartile range. Any data point beyond that distance is shown as an outlier.

To identify the aspects that are informative for objectivity we aggregated the variance per aspect per participant (Figure 11). Since the videos were selected on the difference in objectivity level, we expect the aggregated variance to be the highest for the aspects that are the most important for the objectivity rating of the video. The most expressive aspect is 'spoken content', the least expressive is 'publisher'.

The task involvement of the participants also influences which information they use for credibility judgment. Less engaged participants are inclined not to use the content information but to judge credibility only on the source cue information (physical appearance, overall trustworthiness) [29]. The preference of the participants for the aspects that express content information ('spoken content', 'vocabulary use', and 'title') may, therefore, be credited to high engagement of the participants. The behaviour of the participants in the user survey
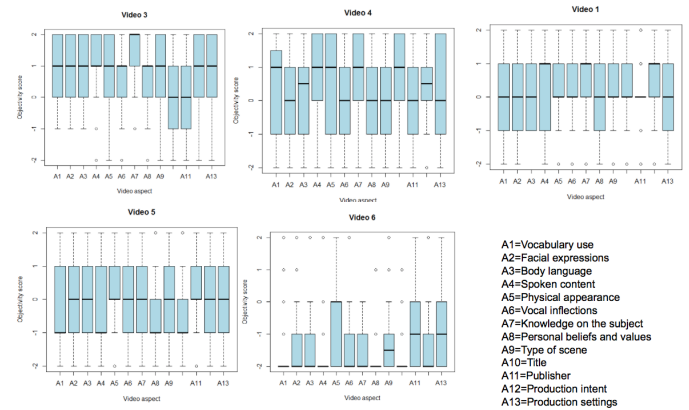
confirm this suggestion: 85 % of the participants that watched the videos (question two), finished the survey in spite of the difficult questions on the concept of objectivity.

*Other results*
After finishing the survey, more participants thought aspartame could be harmful to your health. At the start of the survey, 26 people thought aspartame could be harmful to your health, at the end of the survey 29 people thought aspartame could be harmful to your health (a raise of 7%).

33% of the participants finished the survey. The cause for this low percentage can be the duration of the survey and the perceived difficulty of the questions. 59% percent of the participants quit the survey after the second question.

**Discussion and Limitations**
The 16 participants that judged the video 'Aspartame Killed My Wife - One Mans Story' as the most objective in comparison to the other videos also gave a negative objective value to the video. We believe these participants thought they had to put the most objective video first. This can be explained by the way the question was formulated. We asked to put the most **subjective** video on top. Considering this, we decided to reverse the answer these participants gave to the question on the relative objectivity.

The participants of the user survey are not selected by a random sample; we can not generalise the results to the whole population.

We used a limited number of five videos of a specific genre. Therefore we can not generalise the conclusions of this study to other video genres.

As a result of the limited, non-random sample and restricted choice of videos, we are unable to draw any unambiguous conclusions from the data. However, since this is an exploratory study, we can report some robust trends which are valuable for future exploration on objectivity measures for videos.

**CONCLUSIONS**
The aim of this study was to determine whether an objectivity measure for videos can be provided. We identified 13 aspects

that can indicate the level of objectivity. These aspects are (in order of relevance for the objectivity measure): spoken content, vocabulary use, title, actor's knowledge on the subject, actors facial expressions, production intent category, body language, actor's personal beliefs and values, production settings, type of scene, vocal inflections, physical appearance and publisher.

These aspects manifest themselves in the objectivity elements truthful & factual, neutral, and credible. The most expressive aspects are identified as spoken content, vocabulary use and title. Despite the limitations of this study, the identified aspects report a robust trend in the data. This trend demonstrates the applicability of a measure for objectivity in online videos. The study contributes to the information access and quality research by identifying the relation between objectivity and information that can be captured from videos.

**Objectivity of this Study**
In academic writing, objectivity and persuasion also have to be balanced. Even with the factual support of documentation and data, the argument we make is still very subjective. It is our research question and our decision which methods should be used. And in the end, we want to persuade the reader to take this study seriously. We use the logos appeal in making a valid argument, presenting facts, statistics, definitions to offer evidence in support to our claim. We use academic sources to underpin the statements we make, and we collect reliable data through surveys. We do not use the pathos appeal because we want this study to be neutral, free from bias. And the ethos appeal is used in the style of writing and the selection of words, and the supervision of a professor in the field of information access which reflects on the source credibility of the writer. This study is independent; there are no financial, political or other gains, the pathos appeal. What would be the objectivity rating for this study? Is there a measure to give such an individual rating or can we only give a rating in comparison to other studies? To find a measure we need to know which aspects to evaluate and what the extreme values are. We found consensus for one end of the measure, the very subjective. These findings may help us in future to indicate which videos are (very) subjective and not a reliable information source.

**Future Directions**
The growing volume of online videos calls for automated approaches to video evaluation. Future research should focus on a machine centred approach to provide videos with an auto analysed information quality measure. The use of computational methods, in particular, machine-learning methods (supervised, semi-supervised, or unsupervised), to develop a ranking and assessment function.

Information in the video could be linked to other reliable sources on the internet to evaluate if the information is factual. For example, the identity of the actor in the video can be identified based on the context of the video [3].

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