Verbal and visual framing of responsibility for type 1 diabetes by patient influencers on Instagram

Annemarie Wiedicke, Doreen Reifegerste, Linn Julia Temmann, Sebastian Scherr

Verbal and Visual Framing of Responsibility for Type 1 Diabetes by Patient Influencers on Instagram

Annemarie Wiedicke[1] (iD), Doreen Reifegerste[2],
Linn Julia Temmann[3], and Sebastian Scherr[4]

Abstract

Visuals remain understudied in health-related framing research. On Instagram, users who have been patients of long-term health conditions, such as type 1 diabetes (T1D), and who regularly share their experiences with a wider audience, that is, patient influencers, have become an increasingly important source of health information. Both their verbal and visual portrayal of health issues and how they frame causal and treatment responsibility for them matters for the public perception of health and illness. We aimed at determining how patient influencers verbally and visually portray T1D on Instagram, thus incorporating verbal and visual frame analysis by conducting a multimethod study. Combining insights from a qualitative image sorting study ($N = 168$ images) and a quantitative content analysis of $N = 280$ posts by German patient influencers on Instagram, we show that these influencers frequently share how they feel about their illness and verbally emphasize individual treatment responsibilities. Visually, they mostly share images of their diabetes devices, such as insulin pumps. Overall, the visuals used on Instagram tend to enhance the verbal responsibility frames in the captions, with one specific visual frame attributing individual treatment responsibility.

Keywords

responsibility framing, visual framing, Instagram, patient influencer

Despite their growing significance in the media landscape and their impact on people's knowledge, attitudes, and perceptions regarding health-related issues (Fung et al., 2020; Niu et al., 2020), visuals still remain understudied compared with text in terms of their ability to frame media messages (Coleman, 2010)—especially in health communication (Dan, 2018; Guenther et al., 2021). Social media in particular have fundamentally contributed to a shift from primarily verbal to more visual information (Smith et al., 2021) and changed how people receive and engage with health information (Chen & Wang, 2021; Goodyear et al., 2019). Health information shared on social media is more easily accessible and covers very specific health topics. Specifically, social media allow users to share their personal experiences of health and illness, and to receive social support (Chen & Wang, 2021; Smailhodzic et al., 2016; Zhao & Zhang, 2017). Social media personalities with a larger audience who have been patients of long-term health conditions, such as type 1 diabetes (T1D), and who regularly post about it, have been coined as *patient influencers* (Heiss & Rudolph, 2022, p. 2). These influencers "provide firsthand information and experience concerning

severe, complex health conditions" (Heiss & Rudolph, 2022). Moreover, as "they suffer from a disease themselves, patient influencers may often provide valuable insights and forms of social support" (Heiss & Rudolph, 2022).

There's a growing number of studies on the framing of health issues on social media (e.g., Carlyle et al., 2021; Zhang et al., 2021). However, existing work either analyzes only verbal frames or explores verbal and visual frames separately, instead of assessing the *relation* between text and visuals (Dan, 2018). This is an important omission, since visuals can both alter the perception of messages and foster a reinterpretation of information presented as text (Batova, 2021). We

[1]LMU Munich, Germany
[2]Bielefeld University, Germany
[3]WWU Münster, Germany
[4]University of Augsburg, Germany

Corresponding Author:
Annemarie Wiedicke, Department of Media and Communication, LMU, Oettingenstraße 67, Munich, 80538, Germany.
Email: annemarie.wiedicke@ifkw.lmu.de

addressed this issue by examining both the *verbal and visual framing of responsibility for T1D by German patient influencers on Instagram*, thereby making several contributions to the existing literature: (1) We answer Coleman's (2010) demand for more research about the question whether the—in text—frequently analyzed generic frames (e.g., responsibility frames) are suitable for visual analysis as well. Thus, we incorporate verbal and visual frame analysis. (2) Although health communication scholars have repeatedly examined the *verbal* framing of causal and treatment responsibility for health issues (Major & Jankowski, 2020; Temmann et al., 2022), little is known about the role visuals have in portraying health responsibilities. Our study addresses this issue. (3) Finally, we aim at better understanding how both text and visuals shared by patient influencers on Instagram shape the framing of health responsibilities on this platform.

We focus on T1D, a severe, chronic illness and et al., 2010) the most common autoimmune disease among children and adolescents (Kellerer & Matthaei, 2011)—a significant age group on *Instagram* (Beisch & Koch, 2021). First, we conducted a qualitative study in which we summarized reoccurring motifs shared by T1D patient influencers into specific *images categories* (Grittmann & Ammann, 2018). Those were then applied in a quantitative content analysis of *N* = 280 Instagram posts. In this second study, posts were coded manually, following a deductive approach.

(Visual) Framing of Responsibility in Health Communication

Framing is the process of selecting aspects of a perceived reality and making them more salient in communication, in such a way as to promote a specific interpretation of the information presented (Brüggemann, 2014; Entman, 1993 p. 52). *Frames*, therefore, have been described as "patterns of interpretation" (Brüggemann, 2014, p. 61). There is a growing body of literature on framing and frames (Borah, 2011), particularly in health communication (Guenther et al., 2021). In recent years, framing as a concept has also proven increasingly useful for visual communication scholars (Bock, 2020). *Visual framing* refers to the idea that "visuals, like text, can operate as framing devices insofar as they make use of various rhetorical tools—metaphors, depictions, symbols—that purport to capture the essence of an issue or event graphically" (Rodriguez & Dimitrova, 2011, p. 51). Visuals accompanying a written text, for example, a news article or the caption of an Instagram post, can thus influence recipient's understanding of it (Varava, 2016) or even override its message (Rodriguez & Dimitrova, 2011). Despite having its disciplinary roots in art criticism, photographic practice, rhetoric, semiotics, visual perception, and cognitive science (Bock, 2020; Mitchell, 1986), visual communication scholarship increasingly refers to visual framing as its theoretical fundament (Coleman, 2010). However, compared with verbal frames, visual

frames remain largely understudied (Dan, 2018; Guenther et al., 2021). This is an important omission, since visuals associated with verbal health information can send powerful messages to recipients (Varava, 2016) and thus impact people's (perceived) knowledge, attitudes, intentions, and perceptions regarding health-related issues (Fung et al., 2020; Niu et al., 2020). Visual framing has been investigated for its audience effects, such as emotions (e.g., Sontag, 2018) and behavioral intentions (e.g., Lee et al., 2022). Furthermore, content analyses have addressed the visual framing of various health issues, including *obesity* (e.g., Varava, 2016), or *COVID-19* (e.g., Brennen et al., 2021). However, only a minority of studies takes the *relation* between verbal and visual frames into account (e.g., Brennen et al., 2021). Moreover, these studies did not analyze *visual generic frames*—including responsibility frames. Thus, the role of visuals for attributing health responsibilities remains largely unclear.

Responsibility frames assign *causal* respectively *treatment responsibility* to either an individual, a group or the society at large by means of stressing specific causes and treatment options (or barriers thereof) for certain issues (Iyengar, 1990; Semetko & Valkenburg, 2000). Although these frames are considered *generic*, that is, they can be identified in relation to different topics (De Vreese, 2011), they have largely been examined in the context of health issues (Major & Jankowski, 2020), such as *diabetes* (Foley et al., 2020; Gounder & Ameer, 2018) or *obesity* (Nimegeer et al., 2019; S. Sun et al., 2021).

Content analyses show that news media predominantly attribute health responsibility to the individual. For instance, they stress certain health behaviors, such as smoking and diet, as cause of illness—and the change of these behaviors as treatment option (e.g., Gounder & Ameer, 2018; S. Sun et al., 2021). This is especially true for *diabetes* (Foley et al., 2020; Gounder & Ameer, 2018). Individualized attributions of causal and treatment responsibility for health issues can be problematic for the public perceptions of these diseases (Corrigan, 2000; Heley et al., 2020). A focus on individual responsibilities also reduces the individual willingness to provide social support to those affected (Y. Sun et al., 2016). However, it remains largely unknown how visuals can exacerbate or diminish verbal information in their power to shape responsibility attributions for health issues—an important gap to fill, considering the shift from textual to visual information, especially on social media (Smith et al., 2021). Given that frames should be analyzed not only in specific contexts, but also with regards to specific issues (Brüggemann, 2014), we chose to focus on the verbal and visual framing of *T1D*.

Patient Influencers on Social Media

Social media have become a relevant source of health information (Heiss & Rudolph, 2022; Pagoto et al., 2019; Zou et al., 2021) by offering easily accessible contents. This

comes with important associated risks (e.g., Brennen et al., 2021; Huang et al., 2021; Pilgrim & Bohnet-Joschko, 2019), such as the spread of health-related misinformation (e.g., Brennen et al., 2021) or the reinforcement of body image concerns due to specific appearance ideals and health behaviors depicted on social media (Holland & Tiggemann, 2016; Pilgrim & Bohnet-Joschko, 2019). However, there are potential benefits, too, as social media enable users to share their personal health-related experiences, thoughts, and feelings with others and receive social support from them (Chen & Wang, 2021; Smailhodzic et al., 2016; Zhao & Zhang, 2017). Moreover, health information on social media can impact public beliefs, perceptions and attitudes toward health issues (Fuentes & Peterson, 2021; Ugarte et al., 2021) as well as mobilize social resources (Chen & Wang, 2021).

This is especially true for content shared by so-called *patient influencers* (Heiss & Rudolph, 2022). Importantly, there is a growing amount of literature on social media influencers and their interactions with and impact on audiences (e.g., Abidin, 2015; Cotter, 2019; Truman, 2022). For instance, Cotter (2019) points out the way, in which influencers interact with algorithms to gain visibility—and thus influence. Abidin (2015) shed light on how influencers communicate with their audiences. As for their impact on audiences, a literature review by Truman (2022) found that influencer communication often has positive effects on followers' food and health outcomes. While influencers in general have been described as ordinary social media users who have accumulated a relatively large audience through the verbal and visual narration of their personal lives and lifestyles (Abidin, 2015), *patient influencers* in particular can be defined as social media users who have been patients of long-term health conditions—physical or mental—and who share their health-related experiences regularly with a wider audience (Heiss & Rudolph, 2022, p. 2). Currently, little is known about these patient influencers and the type of content they share online (Heiss & Rudolph, 2022; Zou et al., 2021), despite their growing significance as source of health information, social validation, and social support (Fergie et al., 2016; Heiss & Rudolph, 2022). Moreover, by making illness and living with an illness visible (Feuston & Piper, 2019; McCosker & Gerrard, 2020), these patient influencers can shape the public perception of health (Holtz & Kanthawala, 2020).

The Portrayal of T1D on Instagram

Instagram is an immensely popular picture-sharing platform (Beisch & Koch, 2021; Laestadius, 2017). Usually, an Instagram post consists of a caption, hashtags, and a visual (e.g., a photograph). The platform is especially favored among digital natives (Laestadius, 2017). A growing amount of users on this platform share their experiences and everyday life of living with T1D (Elnaggar et al., 2020; Holtz & Kanthawala, 2020; Ranjanala et al., 2022). T1D is an autoimmune disease with serious short-term and long-term implications, a significant impact on health care systems (Lancaster et al., 2010) and mostly diagnosed during childhood or adolescence (Atkinson et al., 2014).

Sharing health information and experiences of living with a (chronic) disease on social media "is a response to the experience of living with pain, a way of coping with its debilitating effects, while at the same time it can be a potentially transformative act in bringing together issues and publics" (Gonzalez-Polledo, 2016, p. 8). People with T1D in particular use social media, such as Instagram, to seek emotional as well as informational support, to reach out to other patients and offer help (Malik et al., 2019). Despite a growing amount of research regarding the portrayal of chronic illness on social media (e.g., Apperson et al., 2019; Gonzalez-Polledo, 2016), relatively little is known about the way, in which T1D is depicted on Instagram. An exploratory study by Holtz and Kanthawala (2020) offers first insights, as the authors have shown that type 1 diabetics on Instagram often share images of their T1D management devices (e.g., insulin pumps) or images showing their face.

However, the verbal and visual framing of responsibility for T1D on Instagram has not been investigated yet. Given the potential effects of responsibility frames on the public perception of health issues (Heley et al., 2020; McGlynn & McGlone, 2019), on recipient's attributions of responsibility, emotions (Corrigan, 2000; Gollust et al., 2013; Starr & Oxlad, 2021) and their intentions for individual health behavior, interpersonal behavior, and societal participation (Y. Sun et al., 2016), our study seeks to analyze patient influencers' portrayal of responsibility for T1D on Instagram. Minding yet another research gap (Coleman, 2010), we further examine the way, in which text and visuals interact in their ability to frame responsibilities in T1D by incorporating verbal and visual frame analysis.

Responsibilities in T1D: Causes and Treatment

T1D is an autoimmune disease, onset by the destruction of insulin-producing pancreatic beta cells which cannot (at least currently) be prevented (Primavera et al., 2020). In consequence, patients have to continually manage their blood sugar levels by taking insulin (Atkinson et al., 2014). Besides, excise and a balanced diet are considered important individual measures for managing T1D (Adu et al., 2019; Galassetti & Riddell, 2013). While responsibilities are mostly individual, one's social network, i.e., "the web of social relationships that surround individuals" (Heaney & Israel, 2008, p. 190) and the social support it can offer also decisively impact health outcomes for patients with T1D (Miller & DiMatteo, 2013). This includes formal or professional relationships—particularly the one between diabetologist and patient (Renders et al., 2001)—as well as informal social relationships, for example, between family members. For instance, medical adherence in

adolescents with T1D has been shown to benefit from social support within the family (Lewandowski & Drotar, 2007). In contrast, family conflict, a lack of perceived social support and job-related stress are associated with poor adherence in T1D patients (Adu et al., 2019; Lancaster et al., 2010; Miller & DiMatteo, 2013). On a societal level, ongoing research on T1D and continuous improvements of technologies (e.g., insulin pumps, glucose monitors) are significant for the treatment of the disease (Atkinson et al., 2014). The necessity of lifelong treatment of patients with insulin also requires a high quality of medical care as well as a low-threshold access to the health care system (Adu et al., 2019).

Research Questions and Hypothesis

The relation between text and visuals in health communication is not understood well, especially for more specific questions such as the responsibility framing of health issues (Dan, 2018; Guenther et al., 2021). In our study, we address these major research gaps by analyzing the verbal and visual framing of responsibility for T1D by German patient influencers on Instagram. Our first research question, however, addresses the overall content shared by them:

RQ1: Overall, what do posts shared by T1D patient influencers look like? (a) What are the most common topics addressed in captions, (b) what are the most commonly shared hashtags and (c) what are the most common visuals?

News media coverage especially emphasizes individual causal and treatment responsibilities for diabetes (Foley et al., 2020; Gounder & Ameer, 2018), whereas we know much less about how responsibilities in T1D are framed by patient influencers on social media (Heiss & Rudolph, 2022; Temmann et al., 2022). Therefore, we put the following research question and hypothesis forward:

RQ2: To what extent do patient influencers attribute causal and treatment responsibility for T1D in the captions of their posts?

H1: T1D patient influencers mainly attribute individual causal and treatment responsibility for T1D in the captions of their posts.

However, our study not only addresses the *verbal*, but also the *visual framing of responsibility* for T1D. To explore the visual framing of responsibility for T1D, we ask, in a first step, the following research question:

RQ3: Are the responsibility attributions in the captions of the Instagram posts rather (1) enhanced by, (2) neutral toward or even (3) weakened by their corresponding visuals?

In a second step, we further examine only the visuals that are regarded as *enhancing* the verbal responsibility frames to identify possible visual responsibility frames for T1D, asking:

RQ4: Which visual responsibility frames for T1D are emerging from the interplay between responsibility attributions in the captions and the corresponding visuals?

Methods

We used a multimethod approach and combined a qualitative image sorting study (study 1) with a quantitative content analysis (study 2). Image categories (see Grittmann & Ammann, 2018) were drawn from study 1 and then tested on a larger empirical basis as categories in study 2. Thus, we were able to quantitatively examine visual information. Figure 1 illustrates how the two studies are interrelated:
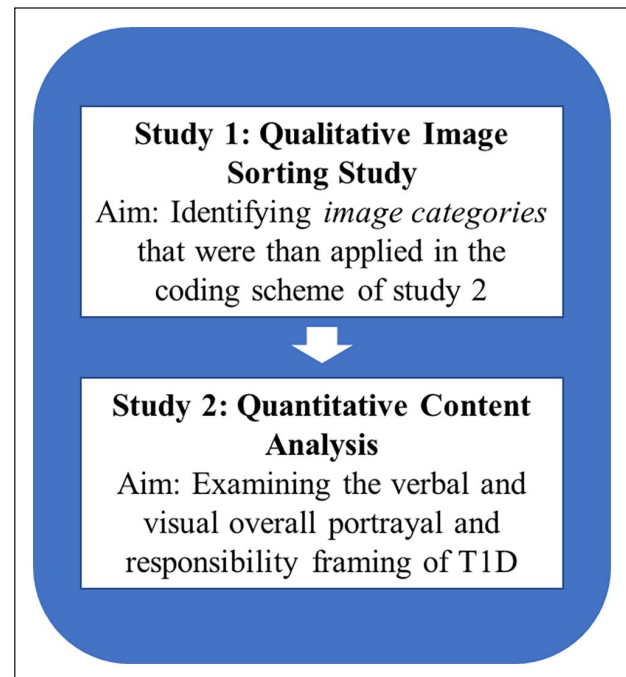
Figure 1. Focus of the two empirical studies.

Sample

In our study, we analyzed posts shared by German T1D patient influencers on Instagram. To identify them, we at first conducted a Google search (search string: "followers" site: instagram.com *diabetes*), with the search results limited to German. We then conducted a search for *accounts* on Instagram, using the search term *diabetes*. To prevent the influence of algorithms as far as possible, we used the so-called "incognito-modus" of the browser during the search and created a new Instagram profile for

research purposes. Our Google and Instagram search on T1D let to $N=66$ profiles. After excluding duplicates, there were $n=62$ profiles left.

Included in our sample were all accounts that met the following criteria: (1) The account had to be publicly accessible with at least 1,000 followers. (2) The definition of patient influencers by Heiss and Rudolph (2022, p. 2) applied, that is, the account belonged to a person with T1D regularly sharing their health-related experiences with a wider audience. (3) The account was mostly in German. (4) There were regular and continuous postings (at least one every 2 weeks) and the last post was, at the time of the data selection, not older than 2 weeks (Altendorfer, 2019). This selection process led to a total of $N=14$ German T1D patient influencers. For each influencer, we analyzed $n=20$ of their most recent posts which led to an overall sample of $N=280$ Instagram posts.

Study 1: Qualitative Image Sorting Study. To examine not only the verbal, but also the visual framing of T1D on Instagram, we conducted a qualitative image sorting study as a first step, that is, we condensed reoccurring motifs in the posted visuals into *image categories* (Grittmann & Ammann, 2018, p. 164). For this purpose, we printed and cut a randomly chosen selection of images shared by the 14 T1D patient influencers in our sample ($N=168$ images in total), which were then sorted by three researchers according to their *genre* (photograph or illustration) and *theme* (e.g., does the image depict a diabetes device). To guarantee the reliability and validity of the image categories, they were thoroughly discussed within our research group (Flick, 2019).

This approach led to a total of 16 different image categories: (1) *diabetes devices*, (2) *selfies/ portraits*, (3) *landscapes with and without people*, (4) *hobbies/ leisure time*, (5) *pregnancy/ motherhood*, (6) *food/ drinks*, (7) *body parts (e.g., showing tattoos)*, (8) *pets/ animals*, (9) *couples/ friendship*, (10) *work/ professional context*, (11) *blood sugar levels*, (12) *quotes (photograph)*, (13) *other photographs*, (14) *quotes (illustration)*, (15) *icons*, and (16) *other illustrations.* These image categories were then integrated in the coding scheme of the quantitative content analysis. This way, we were able to easily code the content of each image (Grittmann & Ammann, 2018).

Study 2: Quantitative Content Analysis. We then conducted a quantitative content analysis. In the following, we describe in detail how (1) we assessed the overall portrayal (verbal and visual) of T1D by patient influencers on Instagram, (2) we measured the verbal framing of responsibility for T1D and the relation to the corresponding visuals, (3) we made sure that our codings were sufficiently reliable, and finally, (4) how we identified visual responsibility frames.

Portrayal of T1D. Instagram posts usually consist of three different elements: caption, hashtags, and visual, with only the latter being mandatory (Laestadius, 2017). To answer
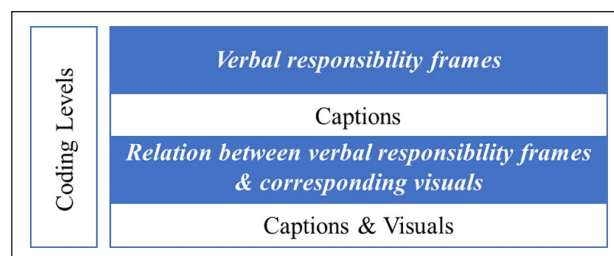
Figure 2. Coding of verbal responsibility frames and relation to corresponding visuals.

RQ1, we noted for each Instagram post whether it contained a **caption** and then coded the captions with regards to the *topics* they addressed. Topics included the different issues addressed in the Instagram posts, ranging from everyday activities to feelings to diabetes-related obstacles. These categories were based on the results of the content analysis by Holtz and Kanthawala (2020) as well as a first browsing of content shared by T1D patient influencers during the development of the codebook. **Hashtags** were coded openly. **Visuals** were coded according to the different *image categories* drawn from our qualitative image sorting study.

Verbal Responsibility Frames and Their Relation to Corresponding Visuals. To examine the verbal framing of responsibility for T1D, we differentiated between two coding levels (Figure 2). At the first level, we coded each **caption** with regards to responsibility attributions for T1D, i.e., *verbal responsibility frames*. These were operationalized as (1) *causes of T1D* (i.e., autoimmune reaction or specific risk factors, such as genetics), (2) *individual treatment responsibilities* (including *treatment options*, e.g., taking insulin, and *treatment barriers*, e.g., unhealthy behaviors), (3) *informal treatment responsibilities* (including *treatment options*, e.g., emotional support, and *treatment barriers*, e.g., conflicts within the family), *formal treatment responsibilities* (including *treatment options*, e.g., support offered by health care professionals and *treatment barriers*, e.g., job-related stress) and, finally, *societal treatment responsibilities* (including *treatment options*, e.g., progress in research on T1D, and *treatment barriers*, e.g., problems in the health care system). The different variables were derived from content analyses of the responsibility framing of diabetes in media coverage (Gollust & Lantz, 2009; Gounder & Ameer, 2018) as well as epidemiological literature about causes and treatment options respectively barriers of T1D (see literature review). The entire text of each caption was examined regarding attributions of responsibility (Gollust & Lantz, 2009). The coding of the different verbal frames was not exclusive, since a caption might attribute responsibility in more than one way. So, each verbal frame was treated as a binary variable and was thus coded as either "present" (1) or "absent" (0) (Gollust & Lantz, 2009).

Table 1. Intercoder-Reliabilities for Main Variables.

	Krippendorff's Alpha
Topics addressed in caption	
Feelings	.670
Therapy	.788
Work	.895
Hobbies/ Leisure time	.749
Family	.733
Pregnancy/ Motherhood	.925
Food/ Drinks	.929
Vacation/ Travel	.881
Symptoms of T1D	.708
Image category	.818
Verbal responsibility frames	
Causal responsibilities	.816
Individual treatment responsibilities	.668
Informal treatment responsibilities	.763
Formal treatment responsibilities	.768
Societal treatment responsibilities	.700
Relation between verbal frame and corresponding visual	.660 to .736

Note. T1D = type 1 diabetes.

To examine the relation between verbal responsibility frames and corresponding visuals, we referred to **captions** and **visuals** as second coding level (Figure 2). We then noted for each attribution of responsibility (including attributions of *causal responsibility* as well as *individual*, *informal*, *formal* and *societal treatment options* and/ or *barriers*), whether the visual could be regarded as "enhancing," "neutral," or "weakening" toward this verbal responsibility frame. For instance, patient influencers often (verbally) discuss their insulin intake in the captions of their posts. In these cases, a photo of an insulin pump was considered as enhancing the verbal frame in the caption, that is, individual treatment responsibility for T1D. We termed these variables *relation variables*.

Intercoder-Reliabilities. Following in-depth training, in which researchers and coders discussed further development and specification of the different variables, as well as a round of pretesting, three trained master students manually coded the posts in the sample. Coding was completed in November 2020. To assess the reliability of the coding scheme across the three coders, we compared their codings for $n = 28$ randomly selected Instagram posts by computing Krippendorff's Alpha via *ReCal3* (Freelon, 2017). Intercoder-reliabilities lay between .660 and .929 (see Table 1 for a detailed list). While most of the variables—including the different *topics* as well as the *image categories*—have been shown to be sufficiently reliable, the *relation variables* have to be assessed critically, as the intercoder-reliability for some of them is below .667 (Krippendorff, 2011). Still, we would like to present our results regarding the relation between verbal responsibility frames and visuals, while keeping in mind that these are of limited explanatory value.

Visual Responsibility Frames: Explorative Analysis. To answer *RQ4*, we conducted a chi-square test to examine which visuals were coded particularly often as *enhancing* in relation to the verbal responsibility frames. We then took a closer look at these particular visuals and their corresponding responsibility attributions in the captions to identify possible visual responsibility frames for T1D.

Results

Sample Characteristics

Our final sample included $N = 280$ posts by $N = 14$ T1D patient influencers, one of them male, the others female. Their numbers of followers ranged from 1,083 to 6,087, with an average number of 2,503 ($SD = 1,479.2$) followers. The analyzed posts were shared between March 2019 and August 2020 and had scored an average of 142 likes ($SD = 118.0$) and 11 comments ($SD = 16.9$). Only a minority of the posts in the sample were sponsored content ($n = 70$, 14.6%).

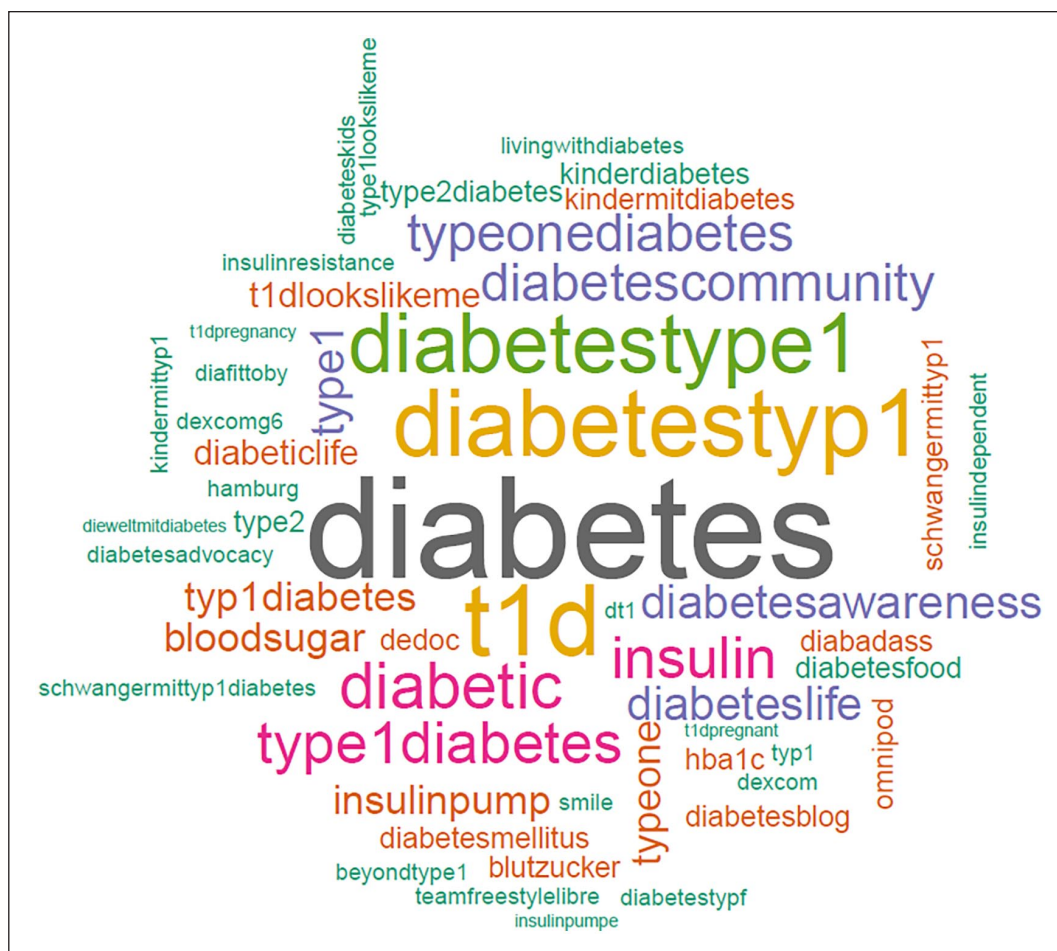### Verbal and Visual Portrayal of T1D Shared by Patient Influencers on Instagram (RQ1)

A majority of 92.5% ($n = 259$) of all $N = 280$ posts in our sample contained a written caption. The most frequently addressed topics in the captions were *feelings* (discussed in $n = 116$ captions), *therapy* ($n = 81$), *hobbies/ leisure time* ($n = 55$), *food/ drinks* ($n = 51$) and *symptoms of the illness* ($n = 44$). Moreover, 87.1% ($n = 244$) of the posts in our sample contained hashtags. Figure 3 illustrates the ones commonly used by T1D patient influencers, with #diabetes ($n = 137$), #t1d ($n = 95$), #diabetestyp1 ($n = 87$), #diabetestype1 ($n = 78$), and #diabetic ($n = 58$) being shared the most frequently. Thus, the majority of hashtags is directly linked to the disease.

Regarding the visual portrayal of T1D (Table 2), most visuals shared by T1D patient influencers were images ($n = 272$, 97.1% of all posts in the sample). Videos, on the other hand, were shared less frequently ($n = 8$, 2.9%). The most commonly depicted image categories were *diabetes devices* ($n = 61$), *selfies/ portraits* ($n = 59$), *landscapes with and without people* ($n = 25$), *hobbies/ leisure time* ($n = 22$) and *pregnancy/ motherhood* ($n = 13$).

Patient Influencers' Verbal Framing of Responsibility and Relation between Verbal Frame and Corresponding Visual (RQ2, H1, and RQ3)

While only a single caption assigned causal responsibility for T1D, treatment responsibility was attributed in 56.0% ($n = 145$) of the captions. Thus, patient influencers mainly addressed *individual treatment responsibilities*; with $n = 114$ attributions of *individual treatment options* and $n = 31$ attributions of *treatment barriers*. Therefore, H1 was supported.

Figure 3. Hashtags frequently shared by T1D patient influencers.

Table 2. Visual Portrayal of T1D on Instagram.

	n	%
Images (photographs and illustrations)	272	97.1
Diabetes devices	61	21.8
Selfies/portraits	59	21.1
Landscapes with and without people	25	8.9
Hobbies/leisure time	22	7.9
Pregnancy/motherhood	13	4.6
Food/drinks	9	3.2
Body parts (e.g., tattoos)	9	3.2
Pets/animals	7	2.5
Couples/friendship	6	2.1
Work/professional context	5	1.8
Blood sugar levels	4	1.4
Quotes (photographs)	4	1.4
Other photographs	24	8.6
Quotes (illustrations)	12	4.3
Icons	5	1.8
Other illustrations	7	2.5
Videos	8	2.9
Total	280	100.0

Note. N = 280 Instagram posts by T1D patient influencers. T1D = type 1 diabetes.

Treatment responsibilities rooted in the social network or on a societal level, however, were depicted less frequently, with *n* = 19 attributions of *informal treatment responsibility* (such as support within the family), *n* = 28 attributions of *formal treatment responsibility* (e.g., support from health care professionals), and finally, *n* = 36 attributions of *societal responsibility* (e.g., development of new diabetes technologies).

Finally, for the majority of attributions of treatment[1] responsibility, the visual was mostly perceived as either *enhancing* (41.9% of all attributions of treatment responsibility, *n* = 96) the frame or *neutral* (46.7%, *n* = 107) toward it. Thus, regarding the framing of responsibilities for T1D on Instagram, text and visuals are usually coherent. For instance, images of diabetes devices enhance the attribution of individual treatment responsibility in written text (Table 3).

Visual Responsibility Frames (RQ4)

Visuals showing *diabetes devices* were coded significantly more often as *enhancing* in relation to the verbal responsibility frame than other visuals, $\chi^2(12) = 52.90$, $V = .462$, $p < .001$.[2] Furthermore, they were coded especially often as enhancing the attribution of *individual treatment options*.

Table 3. Relation Between Verbal Responsibility Frames and Corresponding Visuals.

	Visual *enhances* Verbal frame	Visual *neutral to* Verbal frame	Visual *weakens* Verbal frame	Total	
Individual treatment responsibility					
Treatment options	64	44	6	114	(49.8%)
Treatment barriers	5	21	6	32	(13.9%)
Informal treatment responsibility					
Treatment options	7	5	4	16	(7.0%)
Treatment barriers	0	2	1	3	(1.3%)
Formal treatment responsibility					
Treatment options	6	9	3	18	(7.9%)
Treatment barriers	1	7	2	10	(4.4%)
Societal treatment responsibility					
Treatment options	10	10	1	21	(9.2%)
Treatment barriers	3	9	3	15	(6.6%)
Total	96 (41.9%)	107 (46.7%)	26 (11.4%)	229[a]	(100%)[b]

Note. N = 280 Instagram posts by T1D patient influencers with n = 259 posts containing a caption and thus potentially a verbal responsibility frame.
T1D = type 1 diabetes.
[a]Total number refers to all attributions of treatment responsibility coded in the sample. Multiple codings per caption were possible.
[b]Differences from sum of percentages due to individually rounded underlying figures.

Thus, one specific visual responsibility frame for T1D could be identified. Namely, the depiction of *diabetes devices* to frame *individual treatment responsibility*.

Discussion

Regardless of their growing significance in the media landscape, visuals still remain understudied compared with text in terms of their ability to frame media messages (Coleman, 2010). This is especially true for health communication (Dan, 2018; Guenther et al., 2021); despite the fact that visuals associated with verbal health information can impact people's (perceived) knowledge, attitudes, intentions and perceptions regarding health-related issues to a great extent (Fung et al., 2020; Niu et al., 2020).

In our study, we explored the verbal and visual portrayal of T1D shared by patient influencers on Instagram as well as their verbal and visual framing of responsibility for T1D. Thereby, we addressed two major research gaps at once. First, by incorporating verbal and visual frame analysis, we assessed the relation between verbal health information and visuals that accompany them. Second, we applied a generic frame—the responsibility frame—in visual analysis (Coleman, 2010). Social media platforms such as Instagram have altered the way, in which people receive and engage with health information (Chen & Wang, 2021; Goodyear et al., 2019). Moreover, health information shared social media can impact public beliefs, perceptions and attitudes toward health issues (Fuentes & Peterson, 2021; Ugarte et al., 2021; Zou et al., 2021), with patient influencers additionally providing valuable insights on specific health issues (Heiss & Rudolph, 2022). Thus, we were specifically interested in the way, in which patient influencers frame health

responsibilities—verbally *and* visually. We further chose to focus on content shared on T1D, because of the illness' severity (Lancaster et al., 2010) as well as the growing amount of Instagram users sharing their experiences and everyday life of living with this chronic condition (Holtz & Kanthawala, 2020; Ranjanala et al., 2022).

With regard to the *verbal portrayal* of T1D, our findings show that patient influencers often discuss their *feelings* concerning their illness with their followers, which is in line with current research on the presentation of health issues by patients on social media (Chen & Wang, 2021; Smailhodzic et al., 2016; Zhao & Zhang, 2017). It also confirms the research by Gonzalez-Polledo (2016, p. 8), who referred to the process of sharing health information on social media as "a response to the experience of living with pain, a way of coping with its debilitating effects." Other topics addressed frequently in the captions are *therapy*, *hobbies/ leisure time*, *food/ drinks* as well as *symptoms of T1D*. Thus, T1D patient influencers make their life and daily struggles with the illness visible (Holtz & Kanthawala, 2020), while still presenting content "typical" for Instagram (Machado de Oliveira & Goussevskaia, 2020). The majority of hashtags, however, is directly linked to the disease, leading to the conclusion that T1D patient influencers actively contextualize the information they share to contribute to the discourse on T1D on Instagram (Geboers & van de Wiele, 2020). *Visually*, Instagram posts on T1D reflect both the daily life with the chronic illness and themes generally popular on the platform. In line with Holtz and Kanthawalas (2020) findings, T1D patient influencers frequently share images of their *diabetes devices* as well as *selfies or portraits*.

Furthermore, our results show T1D patient influencers on Instagram assign responsibility with regards to their illness

in about half of their posts. Still, there are huge differences between causal and treatment responsibility, as causes of T1D were mentioned only once in our sample, whereas treatment responsibility was attributed in the majority of the captions. This slightly differentiates the portrayal of health responsibilities on social media from the one in media coverage. While news media discuss treatment responsibilities more frequently than causes of diabetes, too, they still regularly depict (primarily individual) causes of the disease (e.g., Gounder & Ameer, 2018; Stefanik-Sidener, 2013). Moreover, the verbal framing of responsibility T1D on Instagram is highly solution-orientated, as about three quarters of all attributions of treatment responsibilities address *treatment options*. All in all, patient influencers do not extensively depict *why* they're ill or *what* factors contributed to their illness, but rather illustrate how they manage to deal with a chronic health condition on a daily basis. Thus, treatment responsibilities T1D are frequently addressed to the individual, followed by treatment options and barriers rooted in the informal and social network and, finally, societal ones. These results indicate that the verbal framing of responsibility for T1D on social media at least partly resembles the framing of health responsibilities in news coverage, as individual responsibility frames are especially present (Foley et al., 2020; Gounder & Ameer, 2018).

Nevertheless, about one fifth of attributions of treatment responsibilities on the level of the social network emphasizes the significance of social networks as sources of social support for the daily management of a severe chronic health condition like T1D. Our findings therefore reflect the medical evidence of the importance of social support in managing the disease (Adu et al., 2019; Lancaster et al., 2010; Miller & DiMatteo, 2013). While societal treatment responsibilities only play a minor role in patient influencers' verbal framing of T1D on Instagram, they are still acknowledged from time to time.

In our study, we did not only analyze responsibility attributions in written text, but also examined whether these verbal responsibility frames were emphasized by visuals, such as photographs or videos. Our results show that *patients influencers' verbal and visual framing of responsibility for T1D* on Instagram is rather cohesive, with visuals often enhancing the verbal frames in the captions (or at least being neutral), rather than contradicting them. This is an important finding, considering that visuals associated with verbal health information can send powerful messages to recipients (Varava, 2016) and thus further impact people's (perceived) knowledge, attitudes, intensions and perceptions regarding health-related issues (Fung et al., 2020; Niu et al., 2020). In consequence, the responsibility framing of T1D on Instagram potentially has a strong impact on recipients regarding their (1) responsibility attributions for T1D, (2) perception of the illness, (3) emotions toward patients, and (4) willingness to provide social support (Heley et al., 2020; Y. Sun et al., 2016). Finally, based on the results of our quantitative content analysis, we were able to identify a specific visual responsibility frame for T1D that was salient throughout the sample—diabetes devices portraying individual treatment responsibility.

Limitations

Our study has several limitations. We already mentioned that the reliability measures for examining the relation between verbal responsibility frames and visuals were partially insufficient. Future research needs to refine coding schemes that consider responsibility attributions in written text and corresponding visuals. This is quite important—not only in the context of a picture-sharing platform like Instagram, but media in general, as visual communication and visual framing in particular are impactful (Guenther et al., 2021). Furthermore, we only analyzed the content shared by *patient* influencers. To gain more insights about the portrayal of health responsibilities on social media, future studies should include other health influencers as well (e.g., research institutions, health advocates or public health authorities), as they may attribute responsibilities differently. However, according to Zhang et al. (2021), in their social media posts, Chinese media organizations and mental health institutions also assign causes and treatment options for *depression* mainly to the individual. Nevertheless, more research is needed to determine whether this is true for other contexts and other health issues as well.

There are further limitations arising from the sample of our study. First, given its small size ($N=280$ Instagram posts), it is not surprising that we were only able to identify one salient visual frame. Future research should refer to bigger samples to identify further visual (responsibility) frames. Moreover, our analysis focused on "classic" Instagram posts and did not include "stories" (i.e., a feature to share photos or videos for 24 hr, which do not appear on the feed, Instagram, 2016) or "reels" (i.e., short video clips, Instagram, 2020). Future research might want to take a closer look at these different types of content shared on the platform. In addition, our study was restricted to *German* patient influencers. However, former research in this area has shown that the portrayal of responsibilities for health issues can differ, depending on the cultural context (Zhang et al., 2014). Thus, future studies could include cross-cultural comparisons regarding the attribution of responsibility for T1D on social media especially between countries with fundamentally different health care systems. Finally, our sample mainly consists of female patient influencers. This is consistent with findings from Pilgrim and Bohnet-Joschko (2019), who have shown that, in general, more women than men address health topics on social media. However, other authors have shown that male and female patients with T1D equally profit from social media as a place of support (Fergie et al., 2016). Thus, future research should explicitly address male patient influencers. Finally, we focused on one specific health issue, namely T1D, because of its severity (Kellerer & Matthaei, 2011;

Lancaster et al., 2010) as well as the growing number of users sharing their experiences and everyday life of living with T1D on Instagram (Holtz & Kanthawala, 2020). However, previous research has shown that responsibility attributions for health issues differ, depending on the topic discussed (Temmann et al., 2022). Therefore, future studies should address (patient) influencers' verbal and visual framing of responsibility for other health issues as well.

Practical Implications

Our study confirms previously made observations that T1D patients openly and regularly discuss their condition on Instagram (Fergie et al., 2016; Holtz & Kanthawala, 2020). By sharing their experiences with a wider audience, they offer valuable insights into living with a chronic health condition. Moreover, they create spaces and encourage others to share their experiences, too, to give and receive social support. Posting regularly might also have beneficial effects on medical adherence and could be a useful reminder for patients to check their blood sugar levels. However, practical implications also include that health influencers can be a cautionary tale when they use their influence to spread false information about how to treat and cope with T1D. Regular social media monitoring with regards to chronic diseases is necessary to prevent the spread of false information, ideally using automated, self-learning recognition systems for both verbal and visual information. This is of high practical relevance for public health authorities, since the exchange of information on T1D (and other health issues) on social media can shape the way, in which users deal with health and illness.

Conclusion

Although there is a growing amount of research on the responsibility framing of health issues in media coverage (e.g., Gounder & Ameer, 2018; S. Sun et al., 2021), the relation between responsibility attributions in written text and accompanying visuals have often been neglected by health communication scholars. Our study provides a first impression of the way, in which verbal responsibility frames interact with visuals regarding their potential to frame responsibility for health issues. For this purpose, we followed a rather explorative methodological approach to apply a generic frame—such as the responsibility frame—in visual analysis (Coleman, 2010). Overall, our results show that the verbal and visual framing of T1D shared by patient influencers on Instagram is highly coherent, with treatment responsibilities—especially individual treatment options—addressed frequently. Causal responsibility, however, is barely discussed at all on this platform, which distinguishes the portrayal of responsibility for health and illness on Instagram from legacy news media. Regarding the relation between verbal frames and visuals, our findings illustrate that images shared on Instagram often enhance responsibility attributions

made in captions. Moreover, one specific visual responsibility frame was salient throughout the sample: the depiction of diabetes devices to frame individual treatment responsibility. Thus, generic frames, such as the responsibility frame, *can* successfully be applied in visual analysis. Future research should also address other generic frames, such as the *morality* or the *conflict frame* to examine the visual framing of health and illness. Finally, given the impact visuals as well as responsibility attributions in the media can have on recipients, future studies should explore the way, in which the relation between responsibility attributions in written text and visuals such as images may further influence responsibility attributions, attitudes and emotions toward health issues.

ORCID iD

Annemarie Wiedicke [iD] https://orcid.org/0000-0002-1890-9699

Notes

1. Given causal responsibilities were only mentioned once in the sample, we chose to forego the relation between the verbal framing of causal responsibility and visuals.
2. According to a post hoc power analysis using G*Power (Faul et al., 2007), the statistical power of this correlation amounts to 99.2%.

References

Abidin, C. (2015). Communicative ♥ Intimacies: Influencers and perceived interconnectedness. *Ada: A Journal of Gender, New Media, and Technology*, *8*, 1–16. https://doi.org/10.7264/N3MW2FFG

Adu, M. D., Malabu, U. H., Malau-Aduli, A. E. O., & Malau-Aduli, B. S. (2019). Enablers and barriers to effective diabetes self-management: A multi-national investigation. *PLOS ONE*, *14*(6), Article e0217771. https://doi.org/10.1371/journal.pone.0217771

Altendorfer, L.-M. (2019). *Influencer in der digitalen Gesundheitskommunikation: Instagramer, YouTuber und Co. zwischen Qualität, Ethik und Professionalisierung* [Influencer in digital health communication: Instagramer, YouTuber etc. between quality, ethics and professionalization]. Nomos.

Apperson, A., Stellefson, M., Paige, S. R., Chaney, B. H., Chaney, J. D., Wang, M. Q., & Mohan, A. (2019). Facebook groups on chronic obstructive pulmonary disease: Social media content analysis. *International Journal of Environmental Research and Public Health*, *16*(20), Article 3789. https://doi.org/10.3390/ijerph16203789

Atkinson, M. A., Eisenbarth, G. S., & Michels, A. W. (2014). Type 1 diabetes. *The Lancet*, *383*(9911), 69–82.

Batova, T. (2021). "Picturing" xenophobia: Visual framing of masks during COVID-19 and its implications for advocacy in technical communication. *Journal of Business and Technical Communication*, *35*(1), 50–56. https://doi.org/10.1177/1050651920958501

Beisch, N., & Koch, W. (2021). 25 Jahre ARD/ZDF-Onlinestudie: Unterwegsnutzung steigt wieder und Streaming/ Mediatheken sind weiterhin Treiber des medialen Internets: Aktuelle Aspekte der Internetnutzung in Deutschland. In *Media Perspektiven* (pp. 486–508). https://www.ard-zdf-onlinestudie.de/files/2021/Beisch_Koch.pdf

Bock, M. A. (2020). Theorising visual framing: Contingency, materiality and ideology. *Visual Studies*, *35*(1), 1–12. https://doi.org/10.1080/1472586X.2020.1715244

Borah, P. (2011). Conceptual issues in framing theory: A systematic examination of a decade's literature. *Journal of Communication*, *61*(2), 246–263. https://doi.org/10.1111/j.1460-2466.2011.01539.x

Brennen, J. S., Simon, F. M., & Nielsen, R. K. (2021). Beyond (mis)representation: Visuals in COVID-19 misinformation. *The International Journal of Press/Politics*, *26*(1), 277–299. https://doi.org/10.1177/1940161220964780

Brüggemann, M. (2014). Between frame setting and frame sending: How journalists contribute to news frames. *Communication Theory*, *24*(1), 61–82. https://doi.org/10.1111/comt.12027

Carlyle, K. E., Guidry, J. P. D., & Burton, C. (2021). Recipes for prevention: An analysis of intimate partner violence messages on pinterest. *Journal of Interpersonal Violence, 36*, NP6106–NP6123. https://doi.org/10.1177/0886260518812073

Chen, J., & Wang, Y. (2021). Social media use for health purposes: Systematic review. *Journal of Medical Internet Research*, *23*(5), e17917. https://doi.org/10.2196/17917

Coleman, R. (2010). Framing the pictures in our heads: Exploring the framing and agenda-setting effects of visual images. In P. D'Angelo & J. A. Kuypers (Eds.), *Communication series. Doing news framing analysis: Empirical and theoretical perspectives* (pp. 233–261). Routledge.

Corrigan, P. W. (2000). Mental health stigma as social attribution: Implications for research methods and attitude change. *Clinical Psychology: Science and Practice*, *7*(1), 48–67. https://doi.org/10.1093/clipsy.7.1.48

Cotter, K. (2019). Playing the visibility game: How digital influencers and algorithms negotiate influence on Instagram. *New Media & Society*, *21*(4), 895–913. https://doi.org/10.1177/1461444818815684

Dan, V. (2018). *Routledge research in communication studies: Integrative framing analysis: Framing health through words and visuals* (Vol. 4). Routledge.

De Vreese, C. H. (2011). New avenues for framing research. *American Behavioral Scientist*, *56*(3), 365–375. https://doi.org/10.1177/0002764211426331

Elnaggar, A., van Ta Park Lee, S. J., Bender, M., Siegmund, L. A., & Park, L. G. (2020). Patients' use of social media for diabetes self-care: Systematic review. *Journal of Medical Internet Research*, *22*(4), e14209.

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, *43*(4), 51–58.

Faul, F., Erdfelder, E., -Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191.

Fergie, G., Hunt, K., & Hilton, S. (2016). Social media as a space for support: Young adults' perspectives on producing and consuming user-generated content about diabetes and mental health. *Social Science & Medicine*, *170*, 46–54.

Feuston, J. L., & Piper, A. M. (2019). Everyday experiences. In S. Brewster, G. Fitzpatrick, A. Cox, V. Kostakos, & A. L. Cox (Eds.), *CHI 2019: Proceedings of the 2019 CHI conference on human factors in computing systems: May 4–9, 2019, Glasgow, Scotland, UK* (pp. 1–14). Association for Computing Machinery.

Flick, U. (2019). Gütekriterien qualitativer Sozialforschung [Quality criteria for qualitative social research]. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* [Handbook methods of empirical social research] (pp. 473–488). Springer.

Foley, K., McNaughton, D., & Ward, P. (2020). Monitoring the "diabetes epidemic": A framing analysis of United Kingdom print news 1993-2013. *PLOS ONE*, *15*(1), Article e0225794.

Freelon, D. (2017). *ReCal: Reliability calculation for the masses* [Computer software]. http://dfreelon.org/utils/recalfront/

Fuentes, A., & Peterson, J. V. (2021). Social media and public perception as core aspect of public health: The cautionary case of @realdonaldtrump and COVID-19. *PLOS ONE*, *16*(5), Article e0251179.

Fung, C.-H., Blankenship, E. B., Ahweyevu, J. O., Cooper, L. K., Duke, C. H., Carswell, S. L., Jackson, A. M., Jenkins, J. C., Duncan, E. A., Liang, H., -Fu, K. W., & Tse, Z. T. H. (2020). Public health implications of image-based social media: A systematic review of Instagram, Pinterest, Tumblr, and Flickr. *The Permanente Journal*, *24*, 307. https://doi.org/10.7812/TPP/18.307

Galassetti, P., & Riddell, M. C. (2013). Exercise and type 1 diabetes (T1DM). *Comprehensive Physiology*, *3*(3), 1309–1336. https://doi.org/10.1002/cphy.c110040

Geboers, M. A., & van de Wiele, C. T. (2020). Machine vision and social media images: Why hashtags matter. *Social Media + Society*, *6*(2). https://doi.org/10.1177/2056305120928485

Gollust, S. E., & Lantz, P. M. (2009). Communicating population health: Print news media coverage of type 2 diabetes. *Social Science & Medicine*, *69*(7), 1091–1098. https://doi.org/10.1016/j.socscimed.2009.07.009

Gollust, S. E., Niederdeppe, J., & Barry, C. L. (2013). Framing the consequences of childhood obesity to increase public support for obesity prevention policy. *American Journal of Public Health*, *103*(11), e96–e102. https://doi.org/10.2105/AJPH.2013.301271

Gonzalez-Polledo, E. (2016). Chronic media worlds: Social media and the problem of pain communication on Tumblr. *Social Media + Society*, *2*(1), 1–11. https://doi.org/10.1177/2056305116628887

Goodyear, V. A., Armour, K. M., & Wood, H. (2019). Young people and their engagement with health-related social media: New perspectives. *Sport, Education and Society*, *24*(7), 673–688. https://doi.org/10.1080/13573322.2017.1423464

Gounder, F., & Ameer, R. (2018). Defining diabetes and assigning responsibility: How print media frame diabetes in New Zealand. *Journal of Applied Communication Research*, *46*(1), 93–112. https://doi.org/10.1080/00909882.2017.1409907

Grittmann, E., & Ammann, I. (2018). Quantitative Bildtypenanalyse [Quantitative image type analysis]. In T. Petersen & C. Schwender (Eds.), *Die Entschlüsselung der Bilder. Methoden zur Erforschung visueller Kommunikation: ein Handbuch* [Decoding images. Methods for the study of visual communication: A handbook] (pp. 163–178). Herbert von Halem Verlag.

Guenther, L., Gaertner, M., & Zeitz, J. (2021). Framing as a concept for health communication: A systematic review. *Health Communication*, *36*, 891–899. https://doi.org/10.1080/104102 36.2020.1723048

Heaney, C. A., & Israel, B. A. (2008). Social networks and social support. In K. Glanz, B. K. Rimmer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research and practice* (pp. 189–210). John Wiley.

Heiss, R., & Rudolph, L. (2022). Patients as health influencers: Motivations and consequences of following cancer patients on Instagram. *Behaviour & Information Technology*. Advacne online publication. https://doi.org/10.1080/01449 29X.2022.2045358

Heley, K., Kennedy-Hendricks, A., Niederdeppe, J., & Barry, C. L. (2020). Reducing health-related stigma through narrative messages. *Health Communication*, *35*(7), 849–860. https://doi.org/ 10.1080/10410236.2019.1598614

Holland, G., & Tiggemann, M. (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image*, *17*, 100–110.

Holtz, B. E., & Kanthawala, S. (2020). #T1DLooksLikeMe: Exploring self-disclosure, social support, and type 1 diabetes on Instagram. *Frontiers in Communication*, *5*, Article 510278. https://doi.org/10.3389/fcomm.2020.510278

Huang, Q., Peng, W., & Ahn, S. (2021). When media become the mirror: A meta-analysis on media and body image. *Media Psychology*, *24*(4), 437–489. https://doi.org/10.1080/1521326 9.2020.1737545

Instagram. (2016, August 2). Introducing Instagram stories. https:// about.instagram.com/blog/announcements/introducing-insta gram-stories

Instagram. (2020, August 5). Introducing Instagram reels. https:// about.instagram.com/blog/announcements/introducing-insta gram-reels-announcement

Iyengar, S. (1990). Framing responsibility for political issues: The case of poverty. *Political Behavior*, *12*(1), 19–40. https://doi. org/10.1007/BF00992330

Kellerer, M., & Matthaei, S. (2011). Praxisempfehlungen der Deutschen Diabetes-Gesellschaft. *Diabetologie und Stoffwechsel*, *6*(2), 105–106. https://doi.org/10.1055/s-0031-1283738

Krippendorff, K. (2011). *Computing Krippendorff's alpha-reliability* [Working paper]. University of Pennsylvania. https:// repository.upenn.edu/asc_papers/43/

Laestadius, L. I. (2017). Instagram. In L. Sloan & A. Quan-Haase (Eds.), *The SAGE handbook of social media research methods* (pp. 573–592). SAGE.

Lancaster, B. M., Pfeffer, B., McElligott, M., Ferguson, A. T., Miller, M., Wallace, D., & Lane, J. T. (2010). Assessing treatment barriers in young adults with type 1 diabetes. *Diabetes Research and Clinical Practice*, *90*(3), 243–249. https://doi. org/10.1016/j.diabres.2010.07.003

Lee, Y.-I., Wojdynski, B., Keib, K., Jefferson, B. N., Malson, J., & Jun, H. (2022). Image framing, emoticons, and sharing intention for health-related posts on Facebook. *Cyberpsychology, Behavior, and Social Networking*, *25*(2), 140–146. https://doi. org/10.1089/cyber.2021.0002

Lewandowski, A., & Drotar, D. (2007). The relationship between parent-reported social support and adherence to medical treatment in families of adolescents with type 1 diabetes. *Journal of Pediatric Psychology*, *32*(4), 427–436. https://doi.org/10.1093/ jpepsy/jsl037

Machado de Oliveira, L., & Goussevskaia, O. (2020, December 14). *Topic trends and user engagement on Instagram* [Conference session]. IEEE WIC ACM International Conference on Web Intelligence (WI). https://doi.org/10.1109/ WIIAT50758.2020.00073

Major, L. H., & Jankowski, S. M. (2020). *Health news and responsibility: How frames create blame*. Peter Lang.

Malik, F., Panlasigui, N., Gritton, J., Gill, H., Yi-Frazier, J. P., & Moreno, M. (2019). Adolescent perspectives on the use of social media to support type 1 diabetes management: Focus group study. *Journal of Medical Internet Research*, *21*(6), e12149.

McCosker, A., & Gerrard, Y. (2020). Hashtagging depression on Instagram: Towards a more inclusive mental health research methodology. *New Media & Society*, *23*, 1899–1919. https:// doi.org/10.1177/1461444820921349

McGlynn, J., & McGlone, M. S. (2019). Desire or disease? Framing obesity to influence attributions of responsibility and policy support. *Health Communication*, *34*, 689–701. https://doi.org /10.1080/10410236.2018.1431025

Miller, T. A., & DiMatteo, M. R. (2013). Importance of family/ social support and impact on adherence to diabetic therapy. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, *6*, 421–426. https://doi.org/10.2147/DMSO.S36368

Mitchell, W. J. T. (1986). *Iconology: Image, text, ideology*. The University of Chicago Press.

Nimegeer, A., Patterson, C., & Hilton, S. (2019). Media framing of childhood obesity: A content analysis of UK newspapers from 1996 to 2014. *BMJ Open*, *9*(4), e025646. https://doi. org/10.1136/bmjopen-2018-025646

Niu, Z., Jeong, D. C., Brickman, J., Nam, Y., Liu, S., & Stapleton, J. L. (2020). A picture worth a thousand texts? Investigating the influences of visual appeals in a text message-based health intervention. *Journal of Health Communication*, *25*(3), 204–213. https://doi.org/10.1080/10810730.2020.1731631

Pagoto, S., Waring, M. E., & Xu, R. (2019). A call for a public health agenda for social media research. *Journal of Medical Internet Research*, *21*(12), e16661. https://doi.org/10.2196/16661

Pilgrim, K., & Bohnet-Joschko, S. (2019). Selling health and happiness: How influencers communicate on instagram about dieting and exercise: Mixed methods research. *BMC Public Health*, *19*(1), Article 1054. https://doi.org/10.1186/s12889-019-7387-8

Primavera, M., Giannini, C., & Chiarelli, F. (2020). Prediction and prevention of type 1 diabetes. *Frontiers in Endocrinology*, *11*, Article 248. https://doi.org/10.3389/fendo.2020.00248

Ranjanala, S., Wilson, J., Mitchell, P. D., Garvey, K., & Fishman, L. (2022). Contrasting social media use between young adults with inflammatory bowel disease and type 1 diabetes: Cross-sectional study. *JMIR Pediatrics and Parenting*, *5*, e34466. https://doi.org/10.2196/preprints.34466

Renders, C. M., Valk, G. D., Griffin, S. J., Wagner, E. H., Eijk Van, J. T., & Assendelft, W. J. (2001). Interventions to improve the management of diabetes in primary care, outpatient, and community settings: A systematic review. *Diabetes Care*, *24*(10), 1821–1833. https://doi.org/10.2337/diacare.24.10.1821

Rodriguez, L., & Dimitrova, D. V. (2011). The levels of visual framing. *Journal of Visual Literacy*, *30*(1), 48–65. https://doi.org/10.1080/23796529.2011.11674684

Semetko, H. A., & Valkenburg, P. M. (2000). Framing European politics: A content analysis of press and television news. *Journal of Communication*, *50*(2), 93–109. https://doi.org/10.1111/j.1460-2466.2000.tb02843.x

Smailhodzic, E., Hooijsma, W., Boonstra, A., & Langley, D. J. (2016). Social media use in healthcare: A systematic review of effects on patients and on their relationship with healthcare professionals. *BMC Health Services Research*, *16*, Article 442. https://doi.org/10.1186/s12913-016-1691-0

Smith, L. R., Clavio, G., & Lang, A. (2021). Does visual framing drive eye gaze behavior? The effects of visual framing of athletes in an increasingly visual social media world. *Media Psychology*, *24*(4), 562–579. https://doi.org/10.1080/15213269.2020.1765810

Sontag, J. M. (2018). Visual framing effects on emotion and mental health message effectiveness. *Journal of Communication in Healthcare*, *11*(1), 30–47. https://doi.org/10.1080/17538068.2018.1435017

Starr, T. S., & Oxlad, M. (2021). News media stories about cancer on Facebook: How does story framing influence response framing, tone and attributions of responsibility? *Health*, *25*(6), 688–706. https://doi.org/10.1177/1363459320912817

Stefanik-Sidener, K. (2013). Nature, nurture, or that fast food hamburger: Media framing of diabetes in the New York Times from 2000 to 2010. *Health Communication*, *28*(4), 351–358. https://doi.org/10.1080/10410236.2012.688187

Sun, S., He, J., Shen, B., Fan, X., Chen, Y., & Yang, X. (2021). Obesity as a "self-regulated epidemic": Coverage of obesity in Chinese newspapers. *Eating and Weight Disorders*, *26*(2), 569–584. https://doi.org/10.1007/s40519-020-00886-8

Sun, Y., Krakow, M., John, K. K., Liu, M., & Weaver, J. (2016). Framing obesity: How news frames shape attributions and behavioral responses. *Journal of Health Communication*, *21*(2), 139–147. https://doi.org/10.1080/10810730.2015.1039676

Temmann, L. J., Wiedicke, A., Schaller, S., Reifegerste, D., & Scherr, S. (2022). A systematic review of responsibility frames and their effects in the health context. *Journal of Health Communication*, *26*(12), 828–838. https://doi.org/10.1080/10810730.2021.2020381

Truman, E. (2022). Influencing diet: Social media, micro-celebrity, food, and health. In C. Elliott & J. Greenberg (Eds.), *Communication and health* (pp. 143–163). Springer. https://doi.org/10.1007/978-981-16-4290-6_8

Ugarte, D. A., Cumberland, W. G., Flores, L., & Young, S. D. (2021). Public attitudes about COVID-19 in response to president Trump's social media posts. *JAMA Network Open*, *4*(2), e210101.

Varava, K. (2016). Visual framing, stigmatization, race, and obesity: Examining television news presentation of stories about obesity and stories about health. *Communication Studies*, *67*(5), 509–529. https://doi.org/10.1080/10510974.2016.1236348

Zhang, Y., Jin, Y., & Tang, Y. (2014). Framing depression: Cultural and organizational influences on coverage of a public health threat and attribution of responsibilities in Chinese news media, 2000-2012. *Journalism & Mass Communication Quarterly*, *92*(1), 99–120. https://doi.org/10.1177/1077699014558553

Zhang, Y., Lu, Y., Jin, Y., & Wang, Y. (2021). Individualizing mental health responsibilities on Sina Weibo: A content analysis of depression framing by media organizations and mental health institutions. *Journal of Communication in Healthcare*, *14*(2), 163–175. https://doi.org/10.1080/17538068.2020.1858220

Zhao, Y., & Zhang, J. (2017). Consumer health information seeking in social media: A literature review. *Health Information & Libraries Journal*, *34*(4), 268–283. https://doi.org/10.1111/hir.12192

Zou, W., Zhang, W. J., & Tang, L. (2021). What do social media influencers say about health? A theory-driven content analysis of top ten health influencers' posts on Sina Weibo. *Journal of Health Communication*, *26*(1), 1–11. https://doi.org/10.1080/10810730.2020.1865486

Author Biographies

Annemarie Wiedicke (Dr. des., University of Erfurt) is a communication researcher at the Department of Media and Communication, University of Munich. Her research subjects include journalism studies and social media research, with a focus on health communication.

Doreen Reifegerste (PhD, University of Erfurt) is a Professor for Health Communication at the School of Public Health at the Bielefeld University, Germany. Her research interests include health communication with a focus on social aspects of health communication. She is co-founder and co-chair of the thematic section on health communication of the European Communication Research and Education Association (ECREA), and chair of the Health Communication division within the German Communication Association (DGPuK).

Linn Julia Temmann (M.A., University of Münster) is a communication researcher at the Department of Communication, University of Münster, and PhD candidate at the Department of Media and Communication Studies, University of Erfurt. Her research subjects include audience studies, media effects and framing, with a focus on health communication.

Sebastian Scherr (PhD, University of Munich) is a Full Professor and Chair of Digital Health Communication at the University of Augsburg, Germany. His research interests focus on individual and structural susceptibility factors for media effects in the domains of health and political communication, with a special emphasis on mental health, suicide prevention, and empirical methods.