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ORIGINAL ARTICLE



'But I'm not a doctor': pending trust in science among laypeople discussing the brain disease model of addiction

Alexandra Bogren

School of Social Sciences, Södertörn University, Stockholm, Sweden

ABSTRACT

Aim: In recent decades, the notion of addiction as a brain disease has become influential among scientists, public institutions, and addiction treatment professionals, and its popularity raises the question of how biomedical science affects public perceptions of illness. Although existing research has examined how laypeople interpret disease models of addiction, few studies address how they interpret the brain disease model as presented by the media, the version that most citizens are likely to encounter in their everyday lives. This article contributes to existing research by examining Swedish laypeople's interpretations of a news article presenting biomedical research on addiction and analyzing how trust intervenes in their interpretations.

Methods: Drawing on an audience study design with qualitative interviews, the participants were asked to read and discuss a newspaper article that explained how alcohol, amphetamine, and nicotine affect the brain.

Results: The analysis shows that their interpretations depended on how they perceived their own ability to assess the science portrayed in the article. The participants trust doctors and scientists but doubt their own ability to assess the science, and trust is therefore provisional or pending until this situation changes. In addition, trust requires that the participants are able to recognize and identify with the contents of the news article.

Conclusion: This pattern can be understood as a way of dealing with the contradictory expectations laypeople face – they are expected to trust scientific knowledge and to evaluate knowledge claims rationally, but they do not have access to the knowledge that would, supposedly, enable them to do so.

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1. Introduction

In recent decades, the notion of addiction as a disease has gained new ground both in academia and in society at large (Granfield and Reinarman 2015; Room et al. 2015; Heather et al. 2018). As a part of this development, public and scientific interest in biomedical research, biological explanations of mental health problems, and the brain disease model of addiction (BDMA) has grown (Midanik and Room 2005; Midanik 2006; O'Connor and Joffe 2013; Heim 2014; Haslam and Kvaale 2015; Volkow and Koob 2015). Currently, the BDMA is influential among scientists (Midanik 2006; Campbell 2012; Taylor 2016), treatment professionals (Russell et al. 2011; Lawrence et al. 2013; Samuelsson and Wallander 2015), and public institutions, and appears to have a particularly strong footing in the US. Both the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA) officially endorse the model (Volkow and Koob 2015).

Scientists in favor of the BDMA rely on neuroscientific data showing physical alterations in the brain regions associated with learning, motivation, decision-making, and

emotional balance among people with addiction (Volkow et al. 2016). For these scientists, biomedical research has an important role to play in educating the public about addiction:

Despite such reports of benefits to the public from practices and policies generated by research based on the brain disease model of addiction, mobilizing support for further research will require the public to become better educated about the genetic, age-related, and environmental susceptibilities to addiction as they relate to structural and functional changes in the brain. (Volkow et al. 2016: 369)

This view of science communication, together with the rising public and scientific interest in the BDMA, raises the question of how medical science affects public perceptions of illness. On the one hand, surveys imply that laypeople's views of the causes of mental health problems, including addiction, are visibly affected by the increasing popularity of biological explanations (e.g. Pescosolido et al. 2010; Schomerus et al. 2012). On the other hand, research on how the public understands science demonstrates that the link between science and society is not a one-way causal relation where laypeople simply adopt medical perspectives as they appear.

Current research on the public's understanding of science sees the relation between science and society as dialogical

and relational, emphasizing public participation and co-production rather than public lack of knowledge (Jasanoff 2004; Bucchi 2008; Bauer 2009; Suldovsky 2016). Furthermore, for a majority of the public, relations to science are not direct, but are mediated through the mass media (Nelkin 1995; O'Connor et al. 2012; Meurk et al. 2013). Consequently, most citizens are likely to rely on media representations for developing an understanding of the BDMA. Yet despite prior studies of public perceptions of addiction (Koski-Jännes et al. 2012; Meurk et al. 2013; Blomqvist et al. 2014; Meurk et al. 2014; Rise et al. 2015), it remains unclear how laypeople interpret media representations of the BDMA. Instead, most research has focused on the views of influential professional groups, patient and interest groups, and people with drinking problems without considering the role of the mass media (e.g. Midanik 2006; Conrad 2007; Edman 2009; Campbell 2012; Edman and Olsson 2014; Samuelsson and Wallander 2015; Wiens and Walker 2015; Taylor 2016; Fraser et al. 2017). Moreover, while surveys support the premise that there is a gap between what trained researchers know and what the lay public knows (Miller 2010), theories that focus on the lack of public knowledge fail to consider that scientists' and journalists' professional status, identities, and concerns, as well as laypeople's identities and concerns, shape the relationship between science and society (Bucchi 2008; Dunwoody 2008; Hansen 2016). Likewise, the public's trust in researchers and science affects how science is interpreted (Bucchi 2008; Bauer and Falade 2014; Engdahl and Lidskog 2014; Suldovsky 2016). In conclusion, to understand the meanings and effects of science in the public sphere, laypeople's perspectives should be situated in a relational framework that includes their trust in science and the identities and concerns they draw on in making sense of scientific findings. Although trust has been mentioned in research on public perceptions of addiction (e.g. Blomqvist 2009), it has not been further examined or integrated with an understanding of laypeople's social identities and concerns. The purpose of the present article is to address this gap in the literature by (1) examining the social identities and concerns laypeople draw on in interpreting a news article about the BDMA, and (2) studying how trust intervenes in and shapes their interpretations. A better understanding of these processes is central both to elaborating medicalization theory and to improving science communication.

2. The brain disease model of addiction: Existing research and criticism

Following growing interest in the BDMA, critical concerns have been raised about its general validity and wider social effects. The model has been criticized for problems of causality (Kalant 2009; Lewis 2017; Davies 2018) and problems of definition (Kalant 2009; Buchman et al. 2011); for disregarding the embeddedness of drinking and drug use in social, psychological, cultural, political, legal, and environmental contexts (Heim 2014; Davies 2018; Heather et al. 2018); and for collapsing the social under the category of the "environment" (Campbell and Ettore 2011). Aside from

these issues, the claim that the BDMA would remove or reduce stigma among addicted individuals has also attracted a lot of discussion although so far has received little support (Buchman et al. 2011; Kvaale, Haslam and Gottdiener 2013; Haslam and Kvaale 2015; Wiens and Walker 2015; Fraser et al. 2017). Nevertheless, this level of critical discussion is rarely represented in news articles about the BDMA in the mass media (Bogren 2017).

2.1. Neuroscience and the BDMA in the press

Overall, neuroscience is increasingly visible in the press (Racine et al. 2010; O'Connor et al. 2012; O'Connor and Joffe 2013) and so too are biomedical explanations of alcohol problems (Midanik and Room 2005). Despite this development, environmental explanations of addiction still seem to be more common than biological explanations in press reporting (Hellman et al. 2015). Aside from the popularity of different explanations, research in science communication shows that information about the methods and limitations of the research often disappear in the process of transforming knowledge from a specialist to a popular science format (Nelkin 1995; Bucchi 2008; Dunwoody 2008; Racine et al. 2010). For example, the Swedish press concentrates on brief explanations of the brain's reward system and the effects of addiction medication on the brain, but does not discuss the limitations of such research (Bogren 2017). Moreover, the popular science format allows cultural beliefs about behavior, health, and illness to be projected onto or merged with scientific knowledge (e.g. through metaphors and familiar cultural narratives) (Nelkin 1995; Bucchi 2008; Semino 2008; O'Connor et al. 2012). In addition, research in science communication shows that scientists actively try to shape the information communicated, aware that media coverage can affect funding and scientific legitimacy (Bucchi 2008; Hansen 2016), while science journalists on their part often think that the audience will not be able to grasp the detailed reporting that scientists want (Dunwoody 2008). To what extent and how might these patterns in reporting affect laypeople's views of addiction? Research on laypeople's views of health problems, addiction, and the media reporting of medical news provides a valuable starting-point in addressing this question.

2.2. Laypeople's interpretations of health problems and addiction

Existing research presents a multifaceted picture of laypeople's views of health problems. Some studies support the claim that the public has increasingly assimilated biological explanations of depression, schizophrenia, and addiction (Pescosolido et al. 2010; Schomerus et al. 2012). However, other studies show that people who accept biological explanations of health problems do not necessarily exclude social explanations, leading to the conclusion that laypeople's views are more complex than previously believed (O'Connor and Joffe 2013).

With regard to addiction more specifically, both surveys and qualitative studies show that laypeople believe that addiction has multiple causes and that belief in social and psychological causes can be combined with the belief that addiction is a disease (Meurk et al. 2013, 2014). Qualitative studies point to even further complexity as laypeople might see the brain as involved in addiction but still hesitate to call addiction a disease (Meurk et al. 2013; cf. Morphett et al. 2016). Moreover, survey research demonstrates that laypeople's perceptions of addiction vary between substances and countries and between social groups in a country (Blomqvist 2009; Koski-Jännes, Hirschovits-Gerz and Pennonen 2012; Blomqvist et al. 2014). Relatedly, a Norwegian survey suggests that laypeople activate different beliefs about addicted individuals depending on what is salient in the situation (Rise et al. 2015).

In studying laypeople's approaches to the media reporting of medical news, Gabe et al. (2017) found that laypeople not only relied on the contents of news articles, but also compared the news to their own and others' experiences. Moreover, some participants criticized the news as an example of bad science or bad journalism (Gabe et al. 2017). These findings are consistent with research in audience studies (e.g. Kitzinger 1999; Morley 2006; Livingstone 2015) underlining that media effects are 'filtered' through laypeople's approaches to the topic being reported, to media reporting, and to science. Trust, in turn, is an important influence on laypeople's approaches to both media reporting and science (cf. Bucchi 2008; Bauer and Falade 2014; Engdahl and Lidskog 2014; Suldovsky 2016) and can be seen as a mediator that affects laypeople's views of the BDMA.

2.3. Trust in experts and science

Several sociologists have suggested that people in post-industrial societies are increasingly forced to trust experts (Lupton 2013), but also, as Giddens (1991) argues, that trust is not unconditional; it is always open to revision. More specifically, trust can be understood from a relational perspective, where people estimate trustworthiness based on information and knowledge of the other, and from a cultural perspective, where normative obligations to trust and to be trustworthy are formed in relation to social roles (Sztompka 1999). From a cultural perspective, the social roles of doctor and scientist come with expectations to be truthful and reliable. In assessing the reputation – and hence trustworthiness – of professionals, including doctors and scientists, people look for consistency, and a consistent lifestyle or persistent policy is key in determining if a person or an institution is trustworthy (Sztompka 1999). Because it is not possible for laypeople to estimate reputation directly, they rely on external signs of trustworthiness such as credentials (e.g. practicing in highly selective professions, membership in exclusive groups or organizations, or academic degrees) and the indirect opinions of trusted authorities (Sztompka 1999). In contrast, people often have long and intimate knowledge of family members and close friends and tend to judge their trustworthiness based on past actions (Sztompka 1999).

Further developing these perspectives, Engdahl and Lidskog (2014) argue that trust does not depend only or primarily on the collection of facts, but is an emotionally grounded strategy for dealing with uncertainty. The public's knowledge and apprehension of science is based on the social meanings of the issue at hand, the social identities it threatens or supports, and the emotional experience of trust in others and in oneself. "[T]rust concerns citizens' confidence not only in other actors and systems, but also in their own ability to evaluate and judge other actors and systems" (Engdahl and Lidskog 2014: 713–714). In this way, the concept of trust takes the hierarchical social relation between experts and laypeople into account, but also enables an analysis where laypeople are active in interpreting, comparing, and evaluating both their own abilities and expert knowledge. Trust has both emotional and cognitive dimensions, and in the present article these are examined by studying laypeople's discussion of their social identities; their view of the social identities of doctors, scientists, and newspapers; and their self-reflections on their ability to evaluate what doctors and scientists say.

3. Methods

This research is part of a project approved by the Regional Ethics Review Board in Stockholm (decision no. 2011/445-31/5). The empirical material of the project consists of a corpus of newspaper articles about biomedical alcohol research published in four of the largest daily Swedish newspapers (Bogren 2017) along with qualitative interviews with laypeople who were asked to read and discuss two of the articles – one from a morning paper and one from an evening paper – from the larger corpus. Using news articles allowed the participants to discuss biomedical research in a form that they were likely to encounter in their everyday lives, and the two articles were selected for being typical rich and detailed examples of the two genres of newspapers (morning and evening). The analysis is primarily based on the part of the interviews where the participants discussed the morning paper article (Carlsson 2006). The article describes how alcohol, amphetamine, and nicotine affect the brain, with references to two medical scientists who are presented with names, academic titles, and university affiliations. It discusses the neurochemistry of the brain, potential genetic causes of addiction, and medication for treating addiction, but also addresses the reader with an example of eating potato chips and then using the example as a parallel to the behavior of an addicted person. Some additional material from the interview discussion of the evening paper article (Bäsén 2004), an article presenting medical research findings about alcohol and testosterone, was used in analyzing trust in experts.

3.1. Interviews, coding, and analysis

The project adopted an approach that allowed for variation in laypeople's perspectives. This involved finding as varied a group of interviewees as possible, including both women

and men of different ages, social backgrounds, and occupations. Interviewees were recruited through notices posted at large work places, public libraries, schools, and food markets, as well as through e-mails sent to a few municipal district administrations and one large labor union in the Stockholm area. In total, 25 people were interviewed. Of these, 60% were female, and the group was reasonably diverse in terms of age, with about 25% of the sample between 17 and 30 years old, 44% between 31 and 50 years old, and 32% between 51 and 77 years old. About 20% of the interviewees had a job that required higher education (university or equivalent), and 24% were currently studying at the university level. All interviews took place in 2011 and were semi-structured and conversational, enabling the participants to ‘think out loud’ with the interviewers (Miller and Glassner 2016). We began with a broad question asking the interviewees to describe their first reaction to the article.¹ Next, we asked them to describe the topic of the article using their own words and focusing on what they found most relevant. After discussing these issues, we asked whether they agreed with the account presented in the article and whether they found it convincing. At this stage, many interviewees had already commented on the language and style of the article and discussed its trustworthiness.²

The analytical perspective was inspired by Miller and Glassner (2016: 52), who argue that interviews provide evidence both of “what happens” in social worlds and “how individuals make sense of themselves, their experiences, and their place within these social worlds”. The analysis focused on what the interviewees said, how they said it, and how the interview situation shaped their narratives. Coding was developed over several readings of the material. First, the interviews were audio-recorded and transcribed verbatim. The transcribed material was then coded using open coding in a first step followed by theoretically informed coding looking for expressions of trust, skepticism, and distrust. In the third step, the coded material was organized into two themes: *Trust in experts and expert knowledge* and *Identification, experience, and lay knowledge*, where the second theme was a result of the open coding.

4. Analysis

The BDMA highlights genetic and neurochemical aspects of addiction, with medication as the preferred treatment (Midanik and Room 2005). As a background, Table 1 describes how the interviewees viewed these dimensions of the BDMA.

The table indicates that when the participants spoke about the BDMA, they drew on a wide set of social experiences and cultural knowledge rather than on a direct evaluation of the science presented in the article. In relation to trust, this implies that they did not completely assimilate the science, and their own and others’ experiences were an equally important – or more important – source for understanding addiction. The role of experiences and trust is further explained after the presentation of the theme *Trust in experts and expert knowledge*.

4.1. “But I’m not a doctor”: Trust in experts and expert knowledge

The interviewees’ first reactions to the morning paper article varied along two general lines of reasoning. They either talked about the complex medical notions in the text or about personal experiences or the experiences of people close to them. This section presents the lines of reasoning that started out with comments on the medical vocabulary of the article, while Section 4.2 presents the interviewees’ reasoning about personal experiences.

4.1.1. Language, style, and trust: Mixing science and science reporting

When commenting on the medical vocabulary, the interviewees criticized the wording and style of the article. At the same time, this criticism was also directed at science or scientists:

Eh, I think it’s interesting... It gave rise to, well, some questions. I think it’s well written, but depending on the target audience, I think some of these...names of the different substances and things perhaps shouldn’t be necessary that they were in there. [...] You know, all of those – like acamprosate³, and – well, I don’t know if it increases the understanding for the article in general, that he brings up these different medicines for epilepsy and schizophrenia, how they affect glycine and the receptor. (IP17, Cornelia 54⁴)

In this quote, Cornelia starts out criticizing journalistic practices, but moves on to criticize the interviewed scientist (‘he’ in the second part of the quote). This practice of alternating between talking about the journalist and talking about the interviewed scientist makes sense when considering that the article largely relied on interview quotes from one of the scientists. In addition, the article used quotation dashes instead of quotation marks to identify the scientist’s speech. While this is common practice in Swedish news reporting, the lack of textual markers at the end of the quote made it difficult for the participants to separate the journalist’s voice from the scientist’s voice. As a consequence, they were not sure who said what. Some even believed that one

¹Eight participants were interviewed by the project leader Alexandra Bogren and research assistant Katarina Winter, while the other 17 participants were interviewed by K. Winter. A. Bogren is solely responsible for the analysis and writing of the present paper.

²The interviews also examined if the interviewees believed that the news article was somehow relevant to their own consumption, if they usually read similar articles in the paper, and what they thought about the article as compared to other articles on the topic, but this part of the discussion is not analyzed in the present paper.

³Acamprosate, sold under the brand names Campral or Aotal, is a medication for treating alcohol dependence.

⁴IP17 stands for interviewee no 17. The interviewees’ pseudonyms and ages are presented with the quotes. Quotes have been edited to increase understandability, but this was done as little as possible to retain colloquial expressions.

Table 1. The news article's presentation and the interviewees' views of the BDMA.

	Neurochemistry	Genetics	Medication
Key concepts in the article	The reward system; 'short-circuiting'; pleasure; survival; neurotransmitters; dopamine; nerve cells; receptors; glycine.	Twin studies; 'alcoholism is hereditary in some cases'; 'nicotinic receptor genes'.	Acamprosate; Campral; double molecule; amino acid; taurine; 'medication for epilepsy and schizophrenia'; Organon (a pharmaceutical company).
Example quotes from the article	'The reward system is vital for our survival. [...] But it may be short-circuited by alcohol or other drugs. This disturbs the sensitive balance of the brain's neurotransmitters and alters brain chemistry.'	'Does this mean that you inherit a general mechanism of addiction? It appears not. Research points to a hereditary connection between alcohol dependence and nicotine dependence, but not between other types of dependence.'	'We believe that Campral, a double molecule of the amino acid taurine, works like a substitute for alcohol but without the high, much like methadone does for heroin.'
The interviewees' views	A. Neurochemistry is a general feature of humanity that 'affects everyone'. B. Combine a general perspective of neurochemistry with psychological and social perspectives of addiction. C. Not familiar with the BDMA/the neurochemistry of addiction.	Genetics matter, but the environment (specified as family relations; bad childhood; unhappiness; or motivation/personality) is equally important.	A. Mention medication in passing as 'good news'. B. Reflect on the scientist's interest (only a few IPs).
Example quotes from the interviews	A. 'Well, when you go jogging, you have ... eh, it's like using amphetamine, I think. [...] So, there's a lot of chemistry – chemistry and our brains, you don't have to be an alcoholic to understand that ... eh, it affects everyone' (IP11, Elizabeth 45). B. Theresa (IP22) combined a neurochemical perspective on behaviour ('in a way, neurotransmitters govern our behaviours, consciously and unconsciously') with a bio-social perspective on the causes of addiction ('it's a combination of genetic and social, of course'), and a social view of misuse that focused on habitual adjustment to an activity ('[i]f you have to adjust your whole life to a specific activity, then I would say that it's misuse').	'Many people who grew up in families with large scale alcohol abuse won't even look at alcohol. And then the opposite, that they inherit it. And I don't know if it's a minority, those who grew up in alcoholic families [...]. It might not be that many, I don't know, but I've read about some, seen it on TV a couple of times.' (IP8, Emma 77). 'Yeah, I guess it's pretty logical, but I'm not sure if it really is genetic [...]. Well, it might be right, but I still, I believe in the environment more, in fact. And in one's own willpower.' (IP12, Christina 38).	A. 'Yes, I guess it feels pretty nice if they've found eh, a medicine. So, that was the first thing I thought about, that I wasn't aware of this news.' (IP5, Karen 23) B. 'Well, if I think about the end, it feels a little like they're advertising a new medicine. [...] It describes that they've borrowed a medicine ... eh, a preparation that already exists and I think it says that he [the scientist] has a share in the patent. I mean that feels a little like advertising to me.' (IP16, Anne 53).

of the scientists wrote the article, despite being reminded that the text was a journalistic product. Overall, this led to a pattern of talking where they seldom distinguished between critique of science and critique of journalism⁵. Several interviewees described the article as 'serious', 'boring', and 'dry' and involving 'jargon', and they shared Cornelia's view that the concepts made the text, and the science, 'confusing' and difficult to understand.

On the other hand, language was also important for the trustworthiness of the article. Despite commenting on the difficult vocabulary, most interviewees found the morning paper article convincing. When discussing why, they spoke about the trustworthiness of science, information, and facts; the greater reliability of morning papers as compared to evening papers; and the fit between the contents of the article and what they had read, heard, or experienced before (see Section 4.2). When asked what made the article scientific, informative, and factual, they mostly found it difficult

to specify the reasons. Only a few attempted to do so in further detail:

Eh, yes, I see it as convincing... Perhaps because – I don't know, I had the impression that it was built on, with sound knowledge, and then it's – they have indications. They describe that they are in a stage of the research where they see indications of certain things – and they have tested it on rats. But it remains to be seen if these indications are correct and verifiable. And then, when they end on such an open, ehm, yes, that the conclusions are not dead certain, then it feels more serious too. I get the feeling that it's serious. (IP9, Paul 51)

Again, most of the interviewees did not distinguish between the trustworthiness of science and the trustworthiness of science reporting. Like Paul, they mentioned the experiments, the informative and factual language of the article, and the avoidance of dogmatic statements as part of a whole. In this way, it appears as though the news article lent credibility to the science because the language in the article was close to what the interviewees' perceived as scientific standards of writing. The importance of language was brought to the fore again in the spontaneous reactions to the evening paper article, and a majority felt that its wording was 'ordinary', 'unserious', 'unreliable', and 'unscientific'

⁵Unless in those cases when they talked about media reporting in general, criticizing evening papers for their unserious tone. This type of criticism appeared primarily in discussion of the evening paper article.

when compared to the morning paper article and that this made the science presented in the evening paper article less credible. Instead of separating the trustworthiness of the science from the trustworthiness of the reporting, the interviewees' stories implied that the greater credibility of the morning paper genre added to the credibility of the science.

4.1.2. *Trust and the social identity as a non-expert*

Discussing the medical terminology of the article in turn led many of the interviewees to talk about their position as non-experts. They drew on cultural expectations of the social roles of doctors and scientists as truthful and reliable (cf. Sztompka 1999) and compared these to their own position:

I mean, when you drink, you become calm, you feel like ... I mean – you see that for yourself when you drink, that's for sure. But I guess it's general knowledge too. I'm familiar with that. [...] This part about nicotine, I didn't know that. But I'm not a doctor in any way, so I don't know at all; I don't have any knowledge about neurology in that sense. (IP1, Albert 51)

Albert begins by identifying his own experiences in the article's description ('when you drink, you become calm [...] you see that for yourself'). He then acknowledges that part of the article's content was new to him, implying that he had no experience of the effects of nicotine that can verify what the article says. Next, he presents a disclaimer ('But I'm not a doctor in any way'), indicating both that he sees the article as representing an expert ('doctor's') standpoint and that he believes that the interviewer (in the role of researcher/expert) might question him for presenting his 'non-expert' opinion. Like Albert, the interviewees displayed respect for the expert standpoint and, at the same time, saw their own and others' experiences as knowledge relevant to the topic of the article. Although they generally said that they found the article convincing when asked a direct question, this and their skepticism of the medical vocabulary implies that they did not assimilate its contents across the board and without question.

Apart from this, the interviewees also expressed some explicit criticism. In general, they did so either by asking for further verification or by commenting on the underlying motives of the scientists or newspapers. The interviewees who asked for further verification commented on the authority of the interviewed scientists ('we' in the quote below) in an indirect way:

I think it's the form. The form and knowledge. If I knew more about the amino acid, then I might also understand more of what it really does or does not do. How important it is. But right now, it's a word, what someone says: 'And its purpose is this' and 'that's why we can manipulate or affect, by doing this or that'. And then I'm only able to – just pick up that piece of information. I can't really do more than that. (IP2, Anna 26)

Like Anna, these interviewees presented their criticism from a non-expert position, emphasizing that they did not have the knowledge necessary to question the claims of the article. This position makes it reasonable to ask for further verification, but they still did so with caution, stressing, as Albert (IP1) does, that the contents 'seem correct', but that 'if it's science, then you must get to the bottom of things in

another way, [...] sources and things like that'. Asking for further verification did not mean that they distrusted the contents of the article because, as Carl (IP23) argued when asked whether his criticism implied that he did not agree with the article: 'I must draw the line with regard to my own background and where I find the basis of my information. This is a much better source than I am.' He then moved on to explain: 'When we talk about what the facts really are, then it's like, it's hard to contribute, cause I'm only able to describe my perception of things. And they describe something that's facts' (Carl, IP23). Here, Carl returns to his role as non-expert, contrasting it to his expectations of the interviewed scientists as reliable. These stories could be taken to indicate that trust is always open to revision, as Giddens (1991) underlines, but also, and more precisely, that trust in science requires something more, namely laypeople's trust in their own ability to evaluate scientific actors (Engdahl and Lidskog 2014).

The interviewees who commented on the underlying motives of the scientists or newspaper were more explicit in their criticism:

It says here that they share ownership in the patent for the medicine. [...] Well, for an untrained reader it feels like: 'Well, this is the way it is and this is the way it has to be', but then in the end, it becomes apparent that he also works for a pharmaceutical company that wants to make money out of this, and I think – [...]. Well, you should take it with a grain of salt. (IP10, Sofia 22)

The shared ownership in the patent is a textual cue that alerts some of the interviewees to the possibility that economic interests might affect the research findings. In addition, a couple of interviewees talked about the newspaper or journalist as a mediator of the research, arguing that this affected their trust in the article because it 'is someone's opinion, even though it's a scientific text' (IP18, Suzanne 35). Despite being clearly critical, none of these interviewees rejected the contents of the article because parts of it fit with what they had read, heard, or experienced before. Overall, the interviewees – except for one person (IP6)⁶ – trusted the article provisionally and to the extent that they could identify their own experiences, others' experiences, and what they knew from before in the text.

4.2. *'I've read about it, and then it's like me': Identification, experience, and lay knowledge*

As mentioned, another common first reaction was to tell about personal experiences or the experiences of friends or relatives. The interviewees said that they identified their own habits and the habits of others close to them in reading the article. The stories of personal experience were offered in response to the potato chips example, which was a brief narrative in the second paragraph of the morning paper article

⁶The exception, Johan (IP6), says that he fully accepts the contents of the article: 'I don't question anything, I buy it all. [...] It feels like I distrust drug-related scientific articles less than other articles, because it's like – it's such a serious topic and it's not like they would benefit from making things up. There's no reward for lying.'

describing the experience of someone who cannot stop eating chips despite deciding to eat only a few. In the article, this example was used as a parallel to the behavior of an addicted person, with one of the interviewed scientists saying, 'This way of eating chips resembles how an alcohol dependent person drinks'. As Winter (2016) shows, the interviewees spoke about eating candy, ice cream, food, snacks, doing physical exercise, using tobacco, and sometimes drinking alcohol in identifying with the experience of being unable to stop. Some also said that the example made it easier for them to understand part of the experience of being addicted. Identification was based on what they saw as similarities between their own behaviors and the behavior described in the example:

Interviewer: You told us that you identify with this?

Robert: Yes, well, at least I recognize the reward system. I've read about it, then it's like me when I buy chocolate or something. I'm just gobbling it down, piece after piece. [...] When I read 'alcohol short-circuits important part of the brain', I was like, 'Aha!' I thought, 'Okay, yes, sometimes you're a little – there's a short-circuiting going on when you've been drinking alcohol, absolutely'. So, I guess it was that. I think perhaps many people identify with that. (IP13, Robert 46)

The quote from Robert also shows that the interviewees connected their personal experiences to what they had read or heard elsewhere. For a few, this knowledge came from studying medicine or science in high school or at university, for others it came from reading professional literature and attending lectures, but for most this was what they 'just know', 'have always known', or 'have heard' in the media or from unspecified sources:

Interviewer: You said that you recognize some things and that you've read other things. What have you read, to begin with?

Sara: Well, it's this – that it's the reward system, that you drink alcohol, that ehm, you get a reward and then you want to drink more. I guess I've – I almost said I've always known that, since I was a child or youth. That's why people drink too much, cause they feel nice and good and brave. They feel stronger.

Interviewer: Where did that information come from, do you remember?

Sara: Well, I wonder if they taught it – I don't know – if they taught it at school? (IP21, Sara 31)

According to Sztompka (1999), consistency is important in assessing trustworthiness. The interviewees looked for consistency, but consistency between the article and their own experiences, what they've read, and what they 'just know', rather than consistency in the behavior of a person or the policy of an institution. For the interviewees, such consistency is a sign of trustworthiness: 'And the association with smoking, it fits very well, both for me and the people close to me, as far as I know. [...] I think it's correct, quite simply' (IP25, Mark 32). If they could find a fit between the article's contents and their previous experiences and knowledge, this implied that the article was trustworthy.

Family members and friends are potentially important sources in assessing the trustworthiness of knowledge claims presented by distant others (Sztompka 1999). Some of the

interviewees drew on stories about people in their immediate lifeworlds (e.g. a relative or friend or someone they worked with or used to know) as a basis for assessing the article's description of addiction:

Yes, about the potato chips – the image they use to explain how it might work – that's eh, that's easy to read and stuff. [...] Yes, well, it is a little like that, that's the way I understand it, cause I have a background with... my [sibling] is a sober alcoholic. (IP11, Elizabeth 45)

Here too, the interviewees looked for consistency between their relatives and friends' experiences and the contents of the article. The everyday behavioral aspects of addiction were treated as the most important because they were relevant to their relatives and friends. As Elizabeth (IP11) explained when asked about the stories she listened to as a relative in 12-step meetings: 'You don't sit around discussing if it's caused by a specific substance in the brain – that's more like a fact.'

5. Discussion

The purpose of this study was to examine the social identities and concerns laypeople draw on in interpreting a news article about the BDMA, and to study how trust intervenes in and shapes their interpretations. Overall, the participants expressed both trust and doubt in the science reported in the news article. It is suggested here that this attitude can be described as pending trust, a form of trust that is not complete because the participants do not trust their own capacity to evaluate the science reported in the article. Three important findings from the interview discussion of medical vocabulary can be used to further understand pending trust. First, the participants displayed a critical attitude similar to the one held by the participants in Gabe et al. (2017) study, but were more cautious in their criticism. Only three participants explicitly questioned the interviewed scientists, and none saw the article as an example of bad science or bad journalism. Instead, most of them criticized the technical vocabulary of the article. Second, the participants did not necessarily distinguish between science and science reporting, and their criticism of the vocabulary was directed at both the scientists and the newspaper. Third, their criticism of the medical vocabulary was partly a result of self-reflection. They presented their critique from the perspective of a social identity as non-experts, saying that they did not know enough to assess the claims in the article. This relates to an emotional aspect of trust, that of trust in one's own ability to evaluate science and scientists (cf. Engdahl and Lidskog 2014).

On the other hand, when asked later in the interview if they found the article convincing, the participants said they trusted it and believed that it presented scientific facts. This aspect of trust was embedded in their cultural expectations of doctors and scientists as credible, but was also reinforced by cultural expectations of the greater reliability of morning papers and the fit between the language of the article and their expectations of scientific language. This relates to a cultural-cognitive aspect of trust, which is based on the

evaluation of the science in the news article in relation to cultural expectations of scientists, morning papers, and scientific language (cf. Sztompka 1999).

For the participants, developing trust is an ongoing process, requiring that both emotional and cultural-cognitive aspects be fulfilled. The lack of trust in their own ability to assess the science prevented them from trusting it fully, though they recognized that according to cultural expectations, they 'should' trust it. Trust is therefore provisional, or pending, until this situation changes. To invest trust provisionally can be interpreted as a way of dealing with the contradictory expectations facing laypeople in contemporary societies – they are expected to trust scientific knowledge and to evaluate knowledge claims rationally (Lupton 2013), but they do not have full access to the knowledge that would, supposedly, enable them to do so. In addition, trust also comes with social costs (Engdahl and Lidskog 2014); notably, uncritical trust exposes laypeople to the risk of losing face in the interview situation or being misled or cheated in other social situations.

Furthermore, the study indicates that with lack of knowledge about the science laypeople draw on that which is more familiar and trustworthy to them, such as their own experiences, the experiences of people close to them (cf. Sztompka 1999), and wider cultural knowledge. The finding that laypeople's views are formed by their experiences of social interaction with close others adds a relational dimension to previous research (Blomqvist 2009; Meurk et al. 2013; O'Connor and Joffe 2013; Meurk et al. 2014). For future studies of the public's views of addiction, this suggests that a social network approach might be more useful than cross-sectional surveys, because the former method better captures the views and experiences of people in the individual's personal network. Secondly, the participants' stories of the fit between the science reported in the article and what they 'just know' show that cultural representations are integrated in their views on a fundamental level. The participants not only projected cultural ideas onto the science portrayed in the article (cf. O'Connor et al. 2012), but cultural representations informed how they defined and understood their own and others' personal experiences, experiences that they then drew on in assessing the trustworthiness of the science in the article. For example, the participants often said that they recognized 'the reward system' in their own habits. They included very wide and commonplace notions in this concept (e.g. 'there's a short-circuiting going on when you've been drinking alcohol' or 'people drink too much cause they feel nice and good and brave') and said that they had heard and read about it before. This implies that broader cultural representations influenced their views of what 'the reward system' signifies. In what could be called a feedback loop, this version of the reward system was then projected back onto personal experiences and used to assess the credibility of the science in the article.

5.1. Limitations

This study addressed laypeople's interpretations of the BDMA as presented by the media. The conversational

interviews allowed the participants to tell about the issues that concerned them most, and this often resulted in a rich discussion, but also led to variation in the interviewees' stories. For a few participants (IP6, IP20, IP22, IP24), the article was more of an opening for talking about their own or their family's experiences of drinking than an opening for talking about the BDMA. Unless explicitly asked, they rarely related to the science portrayed in the article. On the one hand, this result can be perceived as a weakness of the conversational interview format. On the other hand, it further supports the view that laypeople's daily social concerns are central to the way they relate to media reporting of addiction science. Another limitation with interviews that some of the participants also commented on is that they explicitly allow for critical reflection, while ordinary social situations may not. For example, in a less focused and busier situation, such as the breakfast table, the news article might pass by unnoticed or its contents be accepted more easily. To better capture how the social situation affects the participants' patterns of reading and interpreting the article would require a different study design, for example, an ethnographic, diary-based, or experimental approach. Finally, because this was a case study of a smaller group of laypeople, it cannot be used to draw conclusions about trust in addiction science among the wider Swedish population. Nevertheless, even though the participants were not a representative sample of the population, they were a relatively diverse group of different generations, genders, and occupations. That they still shared similar approaches to the science presented in the article suggests that the different dimensions of trust observed in the study would be relevant to larger groups and in other cultural contexts.

5.2. Implications

In conclusion, this study shows that laypeople's interpretations of the BDMA depend on how they perceive their own ability to assess the science. The participants' cultural-cognitive trust in doctors and scientists is strong, and it persists despite (or because) they perceive the news article as boring and complex with lots of jargon. Nevertheless, doubt in their ability to assess the science portrayed in the article leaves trust pending. In addition, trust requires that the participants are able to recognize and identify with the article and the science. These results imply that research on the expansion of medicalization among laypeople would benefit from realizing that the distinction between scientific theories and the media representations of these theories is not always clear. Cultural representations, including media representations, are not only projected onto science, but science – as it is perceived by laypeople – is projected back onto personal experiences. The results also suggest that there is a need for studies that further explore laypeople's pending trust in doctors and scientists.

Might better public science education (Fischhoff 2013) or education about neuroscience (Haslam and Kvaale 2015) increase laypeople's trust in their ability to assess the science of the BDMA? This is likely to depend on the type of

education. According to research on the public's understanding of science, the public's social identities, concerns, and meaning-making should be included in science education instead of being dismissed as ignorance (e.g. Jasanoff 2004; Engdahl and Lidskog 2014). This implies that researchers need to explore laypeople's perspectives of addiction and explain how these are addressed (if they are) in biomedical research. In doing this, researchers also need to recognize that biological explanations of mental health problems can foster a stigmatizing view of patients even among clinicians and other educated experts (Lebowitz and Ahn 2014; Haslam and Kvaale 2015). Thus, building trust in science also requires self-reflection among researchers and experts.

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