User-generated alcohol-related content on social media

Determinants and relation to offline alcohol use

Eilin Kristine Erevik

Thesis for the Degree of Philosophiae Doctor (PhD)
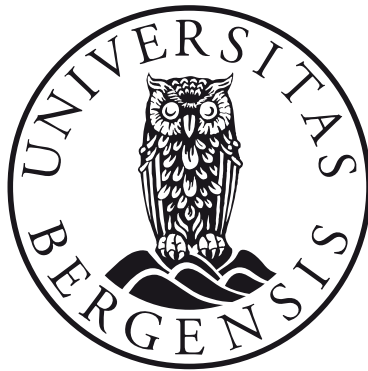University of Bergen, Norway
2018

UNIVERSITY OF BERGEN

User-generated alcohol-related content on social media

Determinants and relation to offline alcohol use

Eilin Kristine Erevik

Thesis for the Degree of Philosophiae Doctor (PhD)
at the University of Bergen

2018

Date of defence: 09.02.2018

Year:	2018
Title:	User-generated alcohol-related content on social media:
	Determinants and relation to offline alcohol use
Name:	Eilin Kristine Erevik
Print:	Skipnes Kommunikasjon / University of Bergen

Scientific environment

I have been employed as a PhD student from 2015-2017 at the Department of Psychosocial Science, Faculty of Psychology, University of Bergen. Further, I have been a member of the Graduate School of Clinical and Developmental Psychology, and the Addiction Research Group at the Faculty of Psychology. My PhD position was funded by the University of Bergen and Bergen municipality.

My main supervisors, Torbjørn Torsheim and Ståle Pallesen, are employees at the Department of Psychosocial Science, Faculty of Psychology, University of Bergen, as well. Cecilie Schou Andreassen, which is a co-author on the three papers in the thesis, is affiliated with Department of Clinical Psychology, Faculty of Psychology, University of Bergen. Øystein Vedaa have also co-authored the papers in this thesis, he is affiliated with Department of Psychosocial Science, Faculty of Psychology, University of Bergen and the Department of Health Promotion at the Norwegian Institute of Public Health.

Acknowledgements

First and foremost I want to thank my supervisors, Torbjørn and Ståle, for sharing their knowledge and for always being helpful and friendly. I want to thank Ståle for being reassuring, available, and inspiring, he has always made me feel much better every time I have felt unconfident or sad. I am also very happy that Torbjørn have been my supervisor, he has given me a great deal of support and time to discuss every possible issue from failing to get my driver license to statistical analyses. I am truly lucky to have had such great supervisors. Further, I want to thank my favourite co-authors, Øystein and Cecile. Øystein, for being the best work friend anyone could have, and for sharing his impressive bank of knowledge and insight with me. I want to thank Cecilie for valuable input on my drafts, friendly e-mails, and fun excursions. I am further grateful for all my colleagues at the Department of Psychosocial Science. I want to thank my former boss Norman Anderssen for all of his support and Aman for his cooperation. I would also like to thank Elfrid, Erlend, and Turi, as well as my extended colleagues and friends, Camilla and Susanne, for comradery and good times.

I would further like to thank my sisters from other mothers, bosom buddies, and friends for offering great breaks from work, and for being patient with me when I have refused to take such breaks. A special thanks to Borghild, Erik, Hanne, Ingrid, Kristin, Marilen, and Tage for being pilots in the tedious survey. I would also like to thank Tage for everything, and for bearing my job talk and spending time with my dog even though he would not have chosen his company. Finally, I would like to thank my family; my mom, Gerdhild, for her help and support and my dad, Ingebret, for being my biggest cheerleader. I am also grateful for all the assistance I have received from my aunt, Marit and my uncle, Jon Øystein.

Abstract

Alcohol is the most commonly used psychoactive substance worldwide. It is considered to increase social cohesion, and to play a part both in the development and expression of identity. Alcohol is, however, also associated with a range of adverse effects for the individual, and involves a great financial and social burden for society. Social media has currently become very popular commodity for social bonding, identity formation and expression, and social influence. This thesis consists of three papers which are based on survey-data, and examines determinants and consequences of user-generated alcohol-related content on social media within a student population. Paper 1 and 2 have a cross-sectional design, while paper 3 has a longitudinal design.

Paper 1 investigated students' disclosure of alcohol on social media, and identified characteristics related to frequent disclosure. The result from paper 1 suggested that most students had posted alcohol content on social media, but few students reported to do so frequently. The alcohol-related content shared primarily portrayed positive aspects of alcohol use. Several characteristics, beside alcohol use, were associated with frequent disclosures, which suggest that disclosure of alcohol content on social media is not solely determined by alcohol use. Younger, single, extroverted students, with lower openness scores were for instance more likely to report frequent disclosures, compared to their counterparts. These characteristics may be related to an increased interest in presenting oneself as social and an increased tendency to adhere to social norms. Frequent disclosure was also associated with more lenient alcohol-related cognitions. Frequent disclosure had the strongest association to reports of frequent exposure to similar content, which suggest that perceived norms for social media behaviour may be the most important determinant of alcohol disclosure on social media.

Paper 2 focused on *exposure* to alcohol on social media. The main aim of this paper was to investigate characteristics associated with reporting frequent exposure. The results from paper 2 suggest that the level of exposure to alcohol content on social media is considerable in the student population. Alcohol-related content on

social media was most frequently interpreted as depictions of positive aspects of alcohol. Several factors predicted exposure. Number of online-friends and frequency of logins to social media were positively associated with exposure to alcohol-related content, which seems self-evident as more time spent on social media and more possible senders of social media content are likely to result in more exposure to all types of social media content. Traits that have been associated with an increased tendency to observe or be interested in others' (i.e. lower extroversion scores, and higher agreeableness and self-monitoring scores) were associated with frequent exposure to alcohol-related content, which suggest that the amount of exposure to alcohol on social media is partly determined by the level of attentiveness towards others in general. Frequent exposure was associated with high alcohol use and lenient alcohol-related cognitions, which could suggest that level of exposure is determined by attentional biases toward alcohol and friendship selection processes. The cross-sectional design employed prevents however conclusions regarding directionality.

In paper 3 longitudinal data was used to examine the relationship between frequent disclosure/exposure at time 1 and alcohol use at time 2 (one year after). The main research question in paper 3 was whether disclosure/exposure may indicate heightened alcohol use over time. A second aim was to identify factors that may explain the relationship between disclosure/exposure and alcohol use. The findings from paper 3 clearly suggested that frequent disclosure and frequent exposure to alcohol-related social media content can indicate heightened alcohol use. Controlling for potential confounding variables (e.g. demographics and personality factors, social media use, and alcohol-related cognitions), weakened the association between disclosure/exposure and later alcohol use, which suggest that such factors may partly explain the relationship between frequent disclosure/exposure and high alcohol use. Controlling for baseline alcohol use (time 1) resulted in the strongest weakening of the relationship between alcohol-related disclosures/exposures and later alcohol use, which could suggest that the relationship between disclosure/exposure and later alcohol use could largely be explained by the association between concurrent alcohol use and alcohol disclosure/exposure on social media. Disclosure of content depicting

positive aspects of alcohol use predicted later alcohol use, even when all covariates were controlled for. This finding could suggest that positive alcohol disclosures on social media may cause a sustained or increased alcohol use, or that the link between positive alcohol disclosures and later alcohol use is explained by other common factors not included in the study.

In summary, the thesis's results suggest that students occasionally disclose alcohol-related content on social media, but that they are more frequently exposed to such content. The participants reported to both share and see content referring to positive aspects of alcohol more often than content referring to negative aspects. The current results suggest that high alcohol use and lenient alcohol-related cognitions are important determinants of disclosure and exposure. In addition, disclosure may be driven by self-presentation and norm adherence intentions, while exposure may be determined by the level of interest in others and engagement in social media. Disclosure and exposure of alcohol-related content indicates heightened alcohol use over time, this effect seems largely to be explained by disclosure/exposure reflecting alcohol use. The predictive value of disclosure/exposure on later alcohol use was dependent on the type of content shared or seen. Disclosure of content referring to positive aspects of alcohol predicted a slightly increasing or sustained alcohol use even when all covariates were controlled for, which suggest that disclosure of this type of content may yield a small causal effect on later alcohol use.

List of publications

Erevik, E. K., Torsheim, T., Vedaa, Ø., Andreassen, C. S., & Pallesen, S. (2017): "Sharing of alcohol-related content on social networking sites: Frequency, content and correlates", *Journal of Studies on Alcohol and Drugs, 78(4),* 608-616. doi: http://dx.doi.org/10.15288/jsad.2017.78.608. *Reprinted with permission from Alcohol Research Documentation Inc.*

Erevik, E. K., Pallesen, S., Andreassen, C. S., Vedaa, Ø., & Torsheim, T. (resubmitted): "Who is watching user-generated alcohol posts on social media?", *Addictive Behaviors.*

Erevik, E. K., Torsheim, T., Andreassen, C. S., Vedaa, Ø., & Pallesen, S. (resubmitted): "Disclosure and Exposure of Alcohol on social Media and Later Alcohol Use: A Large-Scale Longitudinal study", *Frontiers in Psychology.*

List of abbreviations and definitions

Social media: "Includes online and mobile platforms were people voluntarily come together to generate, share, and consume content, including text, pictures, and video" (Westgate & Holliday, 2016)

SNS: Social Networking sites (i.e. social media)

DSM-5: The Diagnostic and Statistical Manual of Mental Disorders (5th ed.)

ICD-10: International Statistical Classification of Diseases and Related Health Problems, 10th Revision

AUDIT: Alcohol Use Disorders Identification Test

Mini-IPIP: Short form of the 50-item International Personality Item Pool, measuring the Five-Factor Model's personality traits (Donnellan, Oswald, Baird, & Lucas, 2006)

Prototypic apprehension: The perceived un/favourability of a person or group conducting a specific behaviour (Zimmermann & Sieverding, 2010)

Descriptive norms: "Social norms in terms of what significant others actually do" (Rivis, Sheeran, & Armitage, 2006)

Alcohol-related cognitions: All cognitive evaluations involving alcohol, e.g. perceived norms for alcohol use, prototypic apprehensions, alcohol expectancies, alcohol identities

SPSS: Statistical Package for Social Sciences

T1: Time of the first survey (fall 2015)

T2: Time of the follow-up survey (fall 2016)

OR: Odds ratio

CONTENTS

1. INTRODUCTION

Alcohol is the most commonly used psychoactive substance worldwide, and the substance has been a part of human culture for millenniums (Dietler, 2006; Winstock, 2014). The first documented instance of alcohol use is suggested to stem from China, and is dated to 7000 Before Christ (Dietler, 2006). Alcohol use and distribution are believed to have played a pivotal role in identity marking and formation, social life, religion, and politics for millennia, and the substance pivotal role in human life still prevails (Dietler, 2006). Since the 70s, alcohol's potential damaging effects on the individual and society, have received increasing attention (Dietler, 2006; Heath, 1987). The substance's popularity and potential damaging effects have consequently resulted in a large body of research on determinants and consequence of alcohol use. While humans have long history of alcohol consumption, the use of social media, on the other hand, is a quite new endeavour. Social media represents web sites and apps where the user can connect to other users worldwide, and upload texts, pictures and videos (Westgate & Holliday, 2016). Social media can be used for entertainment, identity expressions, information seeking, and communication (Aral & Walker, 2012; Seidman, 2013), and they have become an integrated part of everyday life in the recent years (Edosomwan, Prakasan, Kouame, Watson, & Seymour, 2011; Knight-McCord et al., 2016; Perrin, 2015; Statistisk sentralbyrå [Statistics Norway], 2016). Popular sites and apps include Facebook, Snapchat, Twitter, and Instagram (Davenport, Bergman, Bergman, & Fearrington, 2014; Knight-McCord et al., 2016). New technology, like social media could affect the users' thoughts and actions, among these the users' alcohol cognitions and consumption (Bargh & McKenna, 2004; Moreno et al., 2010). In addition, social media can be used to express thoughts and actions regarding alcohol and alcohol use (Westgate & Holliday, 2016).

Social media use may reflect or influence alcohol use through several potential pathways (e.g. alcohol marketing influencing social media users' alcohol use or through excessive personal disclosures on social media reflecting e.g. current intoxication) (Moewaka Barnes et al., 2016; E. C. Westgate & Holliday, 2016). User-generated alcohol-related content (e.g. party pictures) is believed to be a particularly

strong reflection and/or determinant of social media users' alcohol-related cognitions and habits (Boyle, LaBrie, Froidevaux, & Witkovic, 2016; Groth, Longo, & Martin, 2017; Huang, Unger, et al., 2014). According to Bronfenbrenner (1979)'s Ecological Systems Theory, an individual's behaviour are affected by the behaviour of the individuals or institutions in close approximation to the individual (i.e. microsystem), the interaction between individuals or institutions the individual interacts with (i.e. mesosystem), the extended environment the individual is a direct or indirect part of (exosystem), as well as more distant societal factors (i.e. macrosystem). Communication on social media is characterised by being rapid and wide-reaching, as information can be spread rather instantly and independent of geographically boundaries. Social media may as such considerably extend an individual's microsystem, as well as providing an opportunity to observe interactions of which the individual do not partake in. Thus, the amount of sources for social influence on social media is likely to considerably surpass the availability of sources for social influence in offline setting. Hence, social media could considerably increase the level of alcohol exposure, and make the alcohol use of others more conspicuous. Exposure to multiple others' alcohol use through social media may make the viewer form an impression of alcohol use as more common than it actually is. Conforming to alcohol norms, to achieve desired social outcomes and avoid social sanctions, are further believed to be an important motivation for drinking (Perkins, 2007). Exposure to others' alcohol-related content leading to more lenient norms for alcohol use and consequently higher alcohol consumption, is often considered a main pathway trough which social media use may increase alcohol use (Fournier, Hall, Ricke, & Storey, 2013; Groth et al., 2017).

In addition to being influenced by social media use, social media use could also reflect current alcohol use. As such social media is an arena through which the individuals could influence their micro-, meso-, exo-, and macrosystems. Social media users' have been argued to sugar-coat their situation on social media, although they still seem motivated to provide online expressions that match their offline expressions to some degree (Geusens & Beullens, 2016b; Michikyan, Dennis, & Subrahmanyam, 2015). Accordingly, individuals who share more alcohol content

online tend to have a higher consumption in offline settings than those sharing less (Geusens & Beullens, 2016b; Westgate & Holliday, 2016; Westgate, Neighbors, Heppner, Jahn, & Lindgren, 2014). The association between online alcohol disclosure and offline alcohol use have sparked an interest in social media as a potential arena for alcohol prevention and intervention (Groth et al., 2017). Social media may accordingly be a particular apt arena for agents seeking to decrease problematic alcohol use, as this arena could facilitate contact with individuals who might not have been reached through other channels. In addition, management of prevention initiatives on social media could be quite low-cost (e.g. automatic messages send to individuals who shares content with alcohol wordings).

In addition to describing different environmental systems of which the individual influences and is influenced by, Bronfenbrenner (1979)'s Ecological Systems Theory also describes how time aspects such as life transitions (i.e. chronosystem) can affect the individual. One such important and common life transition is the enrolment into higher education (Borsari, Murphy, & Barnett, 2007). The transition to higher education is likely to increase alcohol use and may also enhance the orientation towards social media as a source for information regarding behavioural norms (Bingham, Shope, & Tang, 2005; Moreno et al., 2014; O'Malley & Johnston, 2002). Students' strong involvement in social media and high alcohol use may make them a particularly interesting population for research investigating the intersection between alcohol use and social media.

1.1 Alcohol use

"Alcohol" is a common name used to describe food and drinks containing the chemical substance ethanol (Dietler, 2006). A report by the World Health Organization from 2014 suggested that approximately 52.0% of the global population (i.e., 15 years or older) have consumed alcohol at some time in their lives (World Health Organization, 2014). The prevalence of alcohol use is, however, considerably higher in some parts of the world. For instance, one large scale study of alcohol use in 17 countries (i.e. Australia, European countries, New Zealand, south American

countries, and USA) reported that 90.8% of the adult population had used alcohol the past year (Winstock, 2014). Alcohol is mainly classified as a depressant (i.e. decreasing brain and body activity), but alcohol, at least at lower doses, also involves stimulating effects (i.e. increasing brain and body activity) (Pohorecky, 1978). The behavioural effects of alcohol intake, includes reduced tension, coordination, and inhibitions, and increased pleasure, aggression, and sociability (Hull & Bond, 1986; Steele & Josephs, 1990; Westmaas, Moeller, & Woicik, 2007). It should, however, be noted that the psychoactive effects of alcohol is dependent on cultural and individual expectations towards alcohol, and the amount of alcohol consumed (Hull & Bond, 1986; Lindman, Sjöholm, & Lang, 2000; Westmaas et al., 2007).

1.1.1 Determinants of alcohol use

Several factors are believed to influence whether an individual drink or not, and how alcohol is used. Alcohol's inherent effects, social and other environmental factors, and different cognitive perceptions of alcohol (e.g. alcohol expectancies), could be regarded as main motivations and determinants of alcohol use. These determinants are overlapping and not clearly separated from each other. The immediate effect of alcohol is for instance clearly affected by alcohol expectancies, which in turn could be affected by social learning (Hull & Bond, 1986; Lindman et al., 2000; Westmaas et al., 2007).

Alcohol is believed to have intrinsic rewarding and repelling effects (Verster, 2008; Volkow et al., 2017; Vonghia et al., 2008). Consumption evokes feelings of reward and pleasure trough stimulating brain structures associated with reward (e.g. nucleus accumbens) and increasing dopamine release, in a similar fashion as primary reinforces like food and sex does (Volkow et al., 2017; Yoshimoto, McBride, Lumeng, & Li, 1992). Alcohol's mimicking of the neurotransmitter GABA, which results in a reduced anxiety and tension and therefore an avoidance of punishment, may also be universally rewarding (Koob, 2004; Kumar et al., 2009). Whether, how, and under which conditions alcohol reduces tension is, however, debated (Abrams & Wilson, 1979; Curtin & Fairchild, 2003; Wilson & Abrams, 1977). Alcohol intake

can also lead to different form of physical and psychological pain and discomfort both during and after consumption (e.g. nausea, worsening of depression) (Verster, 2008; Vonghia et al., 2008). The experience of adverse effects of alcohol may result in a decreased interest in the substance. Genes that are most common among individuals of Asian descent, have been linked to an increased occurrence of adverse effects related to alcohol use (e.g. flushing, general discomfort) (Harada, Agarwal, & Goedde, 1995; Peng et al., 1999). In line with the notion of adverse effects as a repellent of further alcohol use, individuals with these genes tend to have lower alcohol consumption (Higuchi, Matsushita, Murayama, Takagi, & Hayashida, 1995; Peng et al., 1999). Alcohol may also indirectly act as a reward or repellent, through enhancing or hampering the attainment of other pleasurable experiences. Alcohol may for instance facilitate flirtation and increase the likelihood of sex, but hamper academic achievement (Cooper, 2006; Singleton & Wolfson, 2009; Thombs et al., 2009; White & Hingson, 2014).

Alcohol is usually consumed in social settings, and social norms and motivations for alcohol use are often considered as an important determinant of its use (Cooper, 1994; Dietler, 2006). Social factors may affect alcohol use through two main pathways, in which the individual could chose to drink to achieve pleasurable social effects or to avoid unwanted social consequences (Cooper, 1994). Alcohol could enhance social cohesion as drinking can reduce social anxiety and enhance self-disclosure (Sayette et al., 2012; Steele & Southwick, 1985; Young, Oei, & Knight, 1990). Hence, social bonding is believed to be an important motivational factor behind alcohol use (Cooper, 1994; Sayette et al., 2012). Alcohol use is also clearly affected and regulated by the alcohol use of friends and peers (Perkins, 2007). Norms are often classified as either subjective (i.e. what significant others perceive as appropriate behaviour) or descriptive (i.e. how significant others actually act). Descriptive norms are believed to be a stronger determinant of alcohol use, compared to subjective norms (Rivis et al., 2006). Specific norms for alcohol use could exists both in a given social networks and on a societal level (Linsky, Colby Jr, & Straus, 1986; Perkins, 2007). Behavioural norms could be adhered to due to informational

influence, where the individuals assume that others condoning or conducting a specific behaviour implies that the behaviour is somehow advantageous (Asch, 1956). Norms adherence can also be related to normative influence, where individuals act in accordance with behavioural norms to achieve pleasant social consequences (e.g. social cohesion) and/or avoid social sanctions (e.g. social ostracism) (Asch, 1956)**.** Accordingly, failing to adjust to drinking norms, which can involve both drinking more and less than the norm, can lead to negative social consequences and loneliness (Leifman, Kuhlhorn, Allebeck, Andreasson, & Romelsjo, 1995; Linsky et al., 1986; Room, 1975; Åkerlind & Hörnquist, 1992). In addition to inappropriate alcohol use leading to loneliness, loneliness could also lead to heightened alcohol use (Åkerlind & Hörnquist, 1992). The claim that alcohol use can be propelled by loneliness is supported by animal studies were socially deprived rats self-administrate alcohol more frequently than rats with normal social interactions (Wolffgramm & Heyne, 1995). Stressors in general, like poverty and abuse, are also known to enhance alcohol use under some conditions (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Khan, Murray, & Barnes, 2002; S. C. Wilsnack, Vogeltanz, Klassen, & Harris, 1997). Other environmental factors which may influence alcohol use include access and exposure (e.g. through advertisement) to alcohol (Anderson, De Bruijn, Angus, Gordon, & Hastings, 2009; Bryden, Roberts, McKee, & Petticrew, 2012).

The individual's cognitive perception of alcohol seems to be an important determinant of alcohol use. A range of alcohol-related cognitions, including but not limited to; alcohol expectancies, alcohol identity, and perceived descriptive norms for alcohol use, seems to determine alcohol use (Perkins, 2007; Thompson & Romo, 2016; Wood, Nagoshi, & Dennis, 1992). Perceived descriptive norms for alcohol use are somewhat overlapping with actual drinking norms, but seems to be an even stronger predictor of alcohol use (Perkins, 2007). How much we believe others to drink is in other words more important in determining our own consumption than how much others actually drink. Perceived descriptive norms are likely to be adhered to of similar reasons as actual norms, i.e. informational or normative influence (Perkins, 2007). Lenient perceived descriptive norms may in some instances be explained by own consumption, where risky drinkers normalise their alcohol habits in

order to justify own consumption (Perkins, 2007). Another class of important alcohol-related cognitions that may determine alcohol use is different aspects of alcohol identity, i.e. how central alcohol is in the individual's identity and the characteristics an individual associates with different alcohol practices (e.g. trashy, cool, sophisticated, juvenile) (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Thompson & Romo, 2016). Identity expression and formation may thus be important motivations for adopting different types of drinking patterns (Dietler, 2006). For instance, could the choice of drinking beer rather than wine mark working class affiliation, masculinity, and nationality (e.g. German), at least traditionally (Aizenman & Brooks, 2008; Towns, Parker, & Chase, 2012; Willis, 1977). For adolescents and young adults alcohol could act as a mean of marking and creating an independent, adult identity (Beccaria & Sande, 2003; Northcote, 2006). The Prototype Willingness model describes cognitive evaluations involved in conducting health risk behaviours, such as drinking or drinking excessively (Gerrard et al., 2008; Gibbons & Gerrard, 1995). According to this theory health choices are made based on both conscious contemplation as well as more rapid automatic reasoning. The theory emphasizes three alcohol-related cognitions as determinants of actual alcohol use, namely willingness, prototypic evaluations, and descriptive norms. Willingness to use alcohol, drinking in excess etc., is related to whether the individual think he or she would engage in the behaviour under certain circumstances, and is considered more as a predisposition to act rather than an intention (Rivis et al., 2006). Prototypic evaluations are the impression the individual has of the typical person conducting the specific risk behaviour and to which degree the individual consider the risk behaviour conductor as similar to themselves. Prototypic evaluations of subjects consuming alcohol are hence related to the associations the individual has to alcohol use (e.g. trashy, cool, sophisticated, juvenile). Finally, the Prototype Willingness model emphasises that perceived descriptive norms for alcohol use predicts alcohol use (Rivis et al., 2006).

Alcohol's pleasant and unpleasant effects, social factors, and beliefs/cognitions regarding alcohol can be seen as broader determinants of alcohol use. Several other

specific characteristics (e.g. demographics and personality traits) have also been found to predict alcohol use. The relationship between individual characteristics and alcohol use can often be related to differences in cognitive evaluations of alcohol, social factors, and/or effects of alcohol. For instance tend younger, male, and single adults to drink more than their counterparts (Andersson, Johnsson, Berglund, & Ojehagen, 2007; Erevik, Pallesen, Vedaa, Andreassen, & Torsheim, 2017). The increased alcohol use among younger individuals may be explained by the increased attention towards forming new friendships associated with young adulthood where alcohol could be an important element in the friendship formation process (Borsari et al., 2007). Singles are likely to have an increased interest in forming romantic relations, which could explain singles' increased alcohol use as alcohol is particularly known to facilitate flirtation and increase the likelihood of sexual encounters (Cooper, 2006). Alcohol use among singles could also be a way to mark an outgoing and fun loving personality, traits that are considered as attractive in a romantic partner (Figueredo, Sefcek, & Jones, 2006). Men have consistently been shown to drink more alcohol than women (Andersson et al., 2007; Erevik et al., 2017; Nolen-Hoeksema, 2004; R. W. Wilsnack, Vogeltanz, Wilsnack, & Harris, 2000). The sex differences in drinking could be explained by several perspectives, one of which is gendered stereotypes (Holmila & Raitasalo, 2005; Nolen-Hoeksema, 2004). Alcohol consumption, in particular high alcohol consumption, has traditionally been seen as a sign of masculinity, and these gendered perceptions of alcohol may still reside today (Dietler, 2006; Nolen-Hoeksema, 2004). Personality traits (i.e. stable tendencies in the way an individual feels, think, and acts) have also been found to predict alcohol use. Extroversion has for instance been linked to heightened alcohol use (Merenakk et al., 2003; Raynor & Levine, 2009). Two aspects of extroversion could explain extroverts' heightened alcohol consumption; an increased sociability and need for stronger stimuli (e.g. more alcohol) to obtain the same level of arousal as introverts (McCrae & John, 1992). Neuroticism is another trait that has been associated with higher alcohol use (Malouff, Thorsteinsson, Rooke, & Schutte, 2007). Neuroticism is related to more psychological distress and anxiety, which may explain the association between neuroticism and high alcohol use as alcohol tends to reduce distress, at least

in the short run (Cowan, 1983; Dixit & Crum, 2000; Grant et al., 2004; McCrae & John, 1992).

1.1.2 Problematic alcohol use

Alcohol has been related to several pleasurable effects on both an individual and societal level, e.g. relaxation and social cohesion, but also to a range of adverse effects like injuries, organ damages, different types of cancer, and crime (Corrao, Bagnardi, Zambon, & La Vecchia, 2004; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002; Rehm et al., 2009; Rehm et al., 2003). In addition, alcohol use can lead to alcohol dependency (i.e. equivalent of the term addiction), a state which is often characterised by continued drinking despite the experience of unwanted physical or social consequences, tolerance development, and withdrawal symptoms associated with drinking cessation (American Psychiatric Association, 2013; World Health Organisation, 1992). Some type of drinking patterns have been suggested to be particularly associated with risk and harm, and the identification and prevention of such drinking patterns have been an popular endeavour in modern alcohol research (Dietler, 2006; Heath, 1987). High total alcohol consumption, and/or drinking larger quantities of alcohol on the same occasion have been especially linked to adverse consequences (Rehm et al., 2003; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). The level of risk and harm associated with drinking is, however, not solely dependent on consumption. Several individual characteristics (e.g., sex, age, genetic predispositions) may influence the vulnerability of experiencing adverse effects of alcohol (American Psychiatric Association, 2013; Nolen-Hoeksema, 2004; Seitz & Becker, 2007; Sorocco & Ferrell, 2006), hence the definitions of problematic alcohol use often involves a combination of consumption and the occurrence of adverse effects.

Problematic episodic drinking is often called binge drinking or heavy episodic drinking (Connor, Gray, & Kypri, 2010; Wechsler, Dowdall, Davenport, & Castillo, 1995). Cut-offs for binge drinking or heavy episodic drinking is usually based on number of drinks (or alcohol units) consumed, but some cut-offs also includes a time

aspect. The most widely used cut-off for binge drinking is drinking 5-6 alcohol units or more on the same occasion (e.g. the same evening/night). A cut-off of 4 alcohol units or more have been suggested for women (Connor et al., 2010; Wechsler et al., 1995). Some have, however, argued that these cut-offs could be too low, and have instead suggested a cut-off of 10 alcohol units or more (Jackson, 2008). Recently a definition of binge drinking as drinking 5-6 units within a timeframe of two hours or less, has been gaining popularity (Courtney & Polich, 2009). The prevalence of binge drinking varies in different populations (e.g., different countries and different age-groups), and is also dependent on how binge-drinking is defined (World Health Organization, 2014). It has been estimated that globally 16.0% of current drinkers consumes 6 units or more on a single occasion monthly or more often. This drinking pattern is most common in Europe (22.9% of drinkers) and least common in the Eastern Mediterranean region (1.6% of drinkers) (World Health Organization, 2014).

Research on problematic drinking patterns over time uses different terms, like hazardous drinking, harmful drinking, alcohol abuse, alcohol dependency/addiction, and frequent/repeated heavy/binge drinking. Although sometimes used interchangeably these terms also have somewhat different meanings. Some conceptualization of problematic long-term alcohol use are based on different operationalisations of consumption (e.g. average units consumed, frequency of heavy drinking), while others are based on the amount of alcohol-related damages/problems or dependency symptoms the drinker is experiencing. Further some conceptualizations of problematic long-term drinking are based on a combination of consumption patterns and the level of negative alcohol effects experienced. Different agents and governments have suggested different cut-offs for which consumption levels that should be considered as risky or harmful. For instance, the Danish government has asserted that a weekly consumption of 21 or more units for men (e.g. approximately four bottles of wine), and a weekly consumption of 14 or more for women (e.g. approximately three bottles of wine), involves a substantial risk for alcohol-related harm (Sundhedsstyrelsen [Danish Health Authority], 2017). Drinking patterns involving regular heavy episodic/binge drinking are often considered as especially detrimental, although individuals who seldom engage in heavy drinking

may be more at risk of injuries when they actually engage in heavy drinking compared to individuals who often engage in such drinking more regularly (Courtney & Polich, 2009; Rehm et al., 2003; Welsh, Knight, & Hadland, 2017). Other conceptualisations of alcohol problems are rather based on consequences of use or symptoms of addiction/dependency than consumption directly, though such problems and symptoms are usually associated with high alcohol intake (American Psychiatric Association, 2013). In the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) problematic alcohol use is termed alcohol use disorder, and classified according to severity (i.e. mild, moderate, and severe) (American Psychiatric Association, 2013). The manual lists 10 symptoms of alcohol use disorder (e.g. drinking larger quantities or over a longer period than intended, continued drinking despite the experience of social problems due to alcohol use, development of alcohol tolerance) and a drinking pattern resulting in 2-3 of these symptoms are considered as a mild alcohol use disorder, an drinking pattern involving 4-5 symptoms are considered as moderate alcohol use disorder, while an drinking pattern resulting in 6 symptoms or more are classified as a severe alcohol use disorder. In ICD-10 problematic alcohol use is termed either as harmful alcohol use or alcohol dependence syndrome (World Health Organisation, 1992). According to ICD-10 harmful alcohol use is characterised by continued alcohol use despite the experience of physical or mental damage due to alcohol consumption. Alcohol dependence syndrome is by ICD-10 described as a state with physiological, behavioural and cognitive characteristics, where alcohol gets a pivotal role in the user's life and is prioritized higher than other things (e.g. work, family) which were previously considered as important to the user. To qualify for the ICD-10's alcohol dependence syndrome the user must demonstrate three of six symptoms (e.g. difficulties controlling alcohol intake, tolerance development, physiological withdrawal symptoms). In addition to descriptions of problematic alcohol use patterns, both DSM-5 and ICD-10 involves diagnoses concerning acute intoxication, withdrawal, and other states (e.g. psychosis) elicited by alcohol use (American Psychiatric Association, 2013; World Health Organisation, 1992). The Alcohol Use Disorders Identification Test (AUDIT) developed by the World Health Organization (1995) is

probably the most frequently used screening instrument by researchers (Bohn, Babor, & Kranzler, 1995). The instrument aims to measure both consumption factors, the experience of alcohol-related problems, and the occurrence of dependency symptoms. AUDIT-scores are classified according to the level of risk associated with the individual's alcohol use, and different patterns are termed low-risk, hazardous, harmful, or dependent. The prevalence of problematic drinking is largely cultural, age, and sex dependent, and also varies based on how problematic drinking is defined and measured (American Psychiatric Association, 2013; World Health Organization, 2014). In USA the 12-month prevalence of DSM-5's alcohol use disorder is estimated to be 4.6% for adolescents aged 12-17 years, and 8.5% for adults (i.e. 18+ years) (American Psychiatric Association, 2013). Global estimates indicates that 1.8% of individuals aged 15 years or older have a drinking pattern that qualifies as harmful according to ICD-10's criteria, and 2.3% have a drinking pattern classified as dependent, worldwide (World Health Organization, 2014). The extent of harmful alcohol use and alcohol dependence is greatest in Europe (3.5% and 4.0%, respectively) and lowest in the Middle East (0.1% and 0.2%, respectively).

1.1.3 Alcohol use among students

The student situation has several features that may enhance alcohol use: i) Students are often in a situation with less responsibility and obligations to workplace, family etc., ii) The formation of new friendships is a developmental task, iii) Students are often in the midst of forming new identities as adults, academics and future professionals, and iiii) Student life is publicly associated with parties and high alcohol use, a perception that is frequently enhanced by media portraits of college life (e.g. in college movies) (Borsari et al., 2007; Osberg, Billingsley, Eggert, & Insana, 2012; Pittman & Richmond, 2008). In addition, students are commonly encouraged to participated in a range of formal and informal rituals involving alcohol use (e.g. "Freshers' week") (Myrtveit, Askeland, Knudsen, Knapstad, & Skogen, 2016). Accordingly, enrolment into higher education has been associated with an increase in alcohol consumption (Bingham et al., 2005; O'Malley & Johnston, 2002). Some studies have suggested that students drink more than non-students at the same age

(O'Malley & Johnston, 2002; Slutske et al., 2004), while other studies indicate that students and non-students at the same age have comparable alcohol consumption but that those individuals that chose higher education had lower alcohol consumption before enrolment (Bingham et al., 2005). Hazardous drinking seems to be quite common among college/university students, with prevalence ranging from 21.1-82.0% across different student populations (Beenstock, Adams, & White, 2011; Heather et al., 2011; Nedregård & Olsen, 2014; Pengpid, Peltzer, van der Heever, & Skaal, 2013). Student drinking have been especially associated with frequent heavy drinking or binge drinking (Slutske et al., 2004; Wechsler et al., 1995). Prevalence of heavy/binge drinking among college/university students differs depending on how heavy/binge drinking is defined, the specific student population, and the timeframe included. A total of 48.8% of the students in a Norwegian study reported to consume 6 units or more on a single occasion monthly or more often (Erevik et al., 2017). In a study among French students 13.8% reported to engage in binge drinking more than twice a month. In that study the cut-offs for binge drinking were 4 units or more for women and five units or more for men (Tavolacci et al., 2016). In a comparable study among American college students it was estimated that approximately 40% of college students drink 5 units or more on the same occasion within a timeframe of two weeks (O'Malley & Johnston, 2002). The high alcohol use among students makes them an interesting population for alcohol research. Students are also often considered as a trendsetting group, as they are young, urban, and resourceful (Pedersen, 2015). The influences students' alcohol use may have on the rest of society's alcohol habits also make the student population especially apt for alcohol research.

1.2 User-generated alcohol content on social media

Social media is an arena where alcohol use seems to be expressed and communicated about quite frequently (Egan & Moreno, 2011; Moreno et al., 2014). Researchers are becoming increasingly interested in how such content may reflect or influence the alcohol use of the individuals who shares or see it. The body of research on the field of user-generated alcohol-related content is rapidly increasing, but a

range of questions still remains largely unanswered. It has been established a clear association between disclosure/exposure of alcohol-related content and elevated alcohol use, but the causal relation between disclosure/exposure and alcohol use is still not understood (Boyle et al., 2016; Geusens & Beullens, 2016b; Huang, Unger, et al., 2014; Westgate et al., 2014). Further, little is known about determinants of disclosure and exposure. Knowledge regarding determinants for alcohol disclosure/exposure on social media could give an indication of which individuals who may be particularly likely to share and view alcohol-related content, and hence also potentially be influenced by it. The identification of determinants of disclosure and exposure could also shed light on the causal relationship between alcohol use and disclosure/exposure, as overlapping determinants could suggest that the relationship may be explained by common factors.

1.2.1 Determinants of disclosure/exposure

Disclosure/exposure of user-generated alcohol-related content on social media seems to be determined by the individual's alcohol use (Geusens & Beullens, 2016b; Huang, Soto, Fujimoto, & Valente, 2014). It is probably uncommon to share alcohol-related content if one does not have some alcohol-related experiences. Likewise exposure may also be predicted by alcohol use as individuals with similar alcohol habits tend to befriend each other (Huang, Soto, et al., 2014). Both disclosure and exposure to alcohol-related content involve, however, an element of deliberation (Boyle et al., 2016; Geusens & Beullens, 2016b). Hence, disclosure and exposure could be determined by a range of factors in addition to alcohol use. Disclosure and exposure to user-generated alcohol-related content may be determined by similar factors as alcohol use, i.e. rewarding effects associated with alcohol disclosure/exposure, social factors, and alcohol-related cognitions. These determinants are not separated from each other, but clearly intertwined. Very few studies have directly investigated determinants of disclosure/exposure, but several assumptions could be made on this issue based on the existing literature. Main potential determinants of disclosure/exposure are illustrated in figure 1.

Social media use may have some inherent rewarding and stimulating aspects, as it provides instant and effortless access to entertainment and social interaction. Social media may be used in part to relieve boredom, and may hence be determined by an individual's need for stimuli and proneness to boredom (Whiting & Williams, 2013). Individuals with more need for stimuli may use social media more excessively. Increased involvement in social media may further result in more disclosure and exposure of alcohol in this arena simply due to the increased time and energy invested in social media (Beullens & Schepers, 2013; Egan & Moreno, 2011; Moreno et al., 2014; Ridout, Campbell, & Ellis, 2012; Westgate & Holliday, 2016; Westgate et al., 2014). Sharing and viewing alcohol content may in addition be extra stimulating as such type of content could be viewed as risky. Disclosure and exposure to alcohol could of these reasons be predicted by a need for stimulation and excitement. In line with this claim, a recent study indicated that the most common motivation for sharing alcohol content on social media was entertainment (Hendriks, Gebhardt, & van den Putte, 2017). Further, disclosure and exposure of alcohol-related content may also be driven by an interest in positive virtual feedback (e.g. likes). User-generated alcohol-related content tends to generate likes and other types of positive feedback (Beullens & Schepers, 2013). Such feedback may be instantly gratifying, as one study suggested that viewing own and others' alcohol content receiving likes stimulates the brain's reward structure nucleus accumbens (Sherman, Greenfield, Hernandez, & Dapretto, 2017).

The level of disclosure and exposure to alcohol on social media may be determined by different social factors. Norms for disclosing alcohol-related content on social media and norms for alcohol use may influence whether the individual choose to disclose such content themselves (Geusens & Beullens, 2016b; Stoddard, Bauermeister, Gordon-Messer, Johns, & Zimmerman, 2012). This hypothesis has, however, only been tested with perceived norms for alcohol use and alcohol-related content on social media. The amount of exposure to alcohol content on social media may also relate to social norms. First and foremost, the amount of exposure to user-generated alcohol-related content is likely to be determined by the level of alcohol

use and alcohol-related postings in the individual's social network. In addition, individuals differ as in how preoccupied they are with adjusting behaviour to social norms (Asch, 1956; Bandura, 1965). Individuals with a stronger preoccupation of conforming to social norms may be more attentive towards others' social media expressions in general, and hence be more likely to notice alcohol-related content as well. This claim has, however, not been scientifically investigated. Further, disclosure and exposure of alcohol content on social media might be driven by social bonding motivations. Sharing party-pictures could for instance be a way of informing others of ones whereabouts and experiences, and to reminisce and consolidate group belonging with other party participants (Hebden, Lyons, Goodwin, & McCreanor, 2015; Hendriks et al., 2017; Niland, Lyons, Goodwin, & Hutton, 2014). Noticing and liking others' alcohol-related social media content could be a way of demonstrating attentiveness and interest towards others, and may as such entail a strategy for building and maintaining social relationships (Canary, Stafford, Hause, & Wallace, 1993). Whether individuals who are motivated to bond with others, actually share and/or see more alcohol content on social media is unknown.

Different cognitive evaluations of alcohol use and alcohol content on social media (e.g. prototypic evaluations and perceived descriptive norms) is likely to determine the level of disclosure and exposure of alcohol content on social media. Perceived norms for drinking and sharing alcohol-related content on social media is likely to be important in determining own sharing of alcohol content on social media. In line with this, alcohol-related disclosures have been found to be associated with stronger perceived norms for sharing alcohol-related content on social media and stronger perceived norms for alcohol use (Geusens & Beullens, 2016b; Stoddard et al., 2012; Westgate et al., 2014). Further, perceived norms specific for alcohol-related disclosure seem to be a stronger predictor for disclosure, compared to perceived norms for alcohol use (Geusens & Beullens, 2016b). Disclosure of alcohol on social media may also be related to more lenient alcohol-related cognitions in general. Disclosure of alcohol-related content on social media has been suggested to be a mean of expressing and forming alcohol identity (D'Angelo, Kerr, & Moreno, 2014; Ridout et al., 2012; Westgate & Holliday, 2016). Accordingly, individuals with more

positive alcohol-related cognitions and stronger alcohol identities appear to be more likely than others to disclose alcohol-related content on social media (Geusens & Beullens, 2016a; Thompson & Romo, 2016; Westgate et al., 2014). Lenient alcohol-related cognitions may predict alcohol disclosure on social media even more than they predict actual consumption, as online settings offers a greater opportunity for deliberate impression management. The amount of exposure to user-generated alcohol content may also be determined by alcohol-related cognitions, as individuals with elevated alcohol use seem to demonstrate an attentional bias toward alcohol stimuli (Field, Mogg, Zetteler, & Bradley, 2004). Why this attentional bias occurs is unknown, but it have been suggested that it might be explained by risky drinkers seeking to confirm their alcohol-related cognitions (Boyle et al., 2016; Field et al., 2004).

In addition to the broader determinants (i.e. alcohol use, immediate gratification, social factors, and alcohol-related cognitions) that may predict alcohol-related disclosures and exposures on social media; disclosure/exposure may also be predicted by several more specific individual characteristics (e.g. demographics and personality traits). These characteristics may relate to the different broader motivations, younger individuals may for instance be more preoccupied with social bonding (Borsari et al., 2007; Fraley & Davis, 1997), which may also make them more likely to disclose and be exposed to others' alcohol-related content. In addition, individuals tend to befriend individuals who are similar to themselves (e.g. age wise, personality wise) (Selfhout et al., 2010; Subrahmanyam, Reich, Waechter, & Espinoza, 2008). Hence, possessing certain characteristics associated with elevated alcohol use (e.g. younger age), could increase the total amount of alcohol-related content available on social media, even if the specific user do not display heightened alcohol consumption. Very few studies have investigated characteristics associated with sharing or seeing alcohol-related content on social media. Some studies have, however, suggested that male sex, nonreligious identification, lowered conscientiousness and agreeableness scores, and higher neuroticism scores are associated with more disclosures of alcohol content on social media (Hendriks et al.,

2017; Karl, Peluchette, & Schlaegel, 2010; Moreno et al., 2010; Peluchette & Karl, 2008). Women have on the other hand been found to report more exposure to alcohol on social media, compared to men (Boyle et al., 2016).
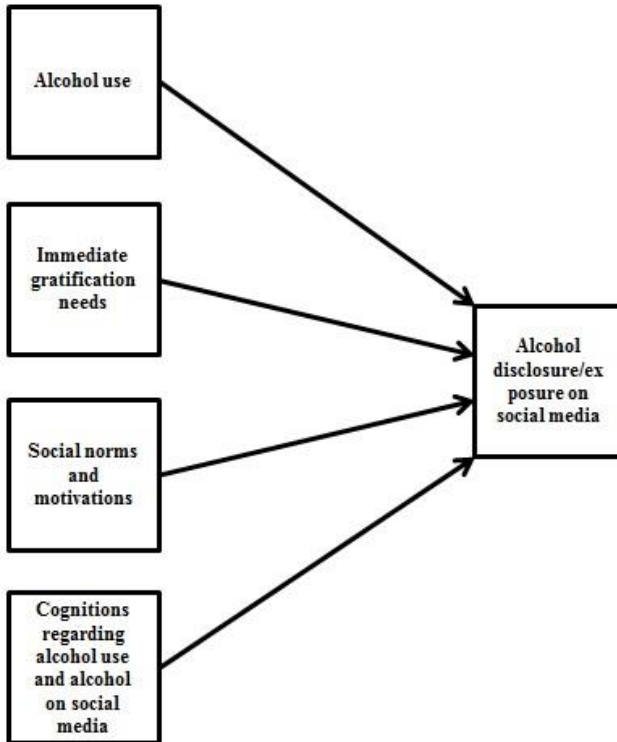
Figure 1 Potential determinants of alcohol disclosure/exposure on social media

1.2.2 Disclosure/exposure and alcohol use

The association between alcohol use and disclosure/exposure of alcohol on social media may be explained by one of or a combination of three potential causal pathways: i) Third variables (e.g. social bonding motives, personality traits) may explain both increased disclosure/exposure and increased alcohol use, ii) Heightened alcohol use could cause more disclosure/exposure, or iii) Disclosure/exposure of alcohol on social media could cause an increase in alcohol use (Groth et al., 2017;

Moreno, Christakis, Egan, Brockman, & Becker, 2012; Westgate & Holliday, 2016).
The potential causal connections between disclosure/exposure and alcohol use are
illustrated in figure 2.

Alcohol use and alcohol-related disclosures and exposures on social media
seem to be motivated by similar drives (e.g. identity expression, boredom relief,
social bonding). The association between disclosure/exposure and alcohol use may
hence be explained by such common determinants (Westgate et al., 2014). Some of
the few demographic and personality characteristics that have been associated with
disclosure or exposure have also been associated with high alcohol use. Lower scores
on conscientiousness have for instance been positively associated with both
disclosure of alcohol-related content on social media and heightened alcohol use
(Karl et al., 2010; Malouff et al., 2007). Excessive social media use predicts both
heightened alcohol use and alcohol-related disclosure and exposure on social media
(Beullens & Schepers, 2013; Egan & Moreno, 2011; Moreno et al., 2014; Ridout et
al., 2012; Westgate & Holliday, 2016; Westgate et al., 2014). Lenient alcohol-related
cognitions could also be a common factor in the relationship between alcohol use and
disclosure/exposure, as lenient alcohol-related cognitions may predict both elevated
alcohol use, and disclosure and exposure of alcohol on social media (Geusens &
Beullens, 2016a; Perkins, 2007; Thompson & Romo, 2016; Westgate et al., 2014;
Wood et al., 1992). Previous studies investigating the relationship between
disclosure/exposure and alcohol use have controlled for some factors, like sex, age,
number of online-friends, and certain alcohol-related cognitions (e.g. perceived
norms for alcohol use, alcohol attitudes, and alcohol identity) (Boyle et al., 2016;
D'Angelo, Kerr, et al., 2014; Glassman, 2012; Huang, Soto, et al., 2014; Huang,
Unger, et al., 2014; Miller, Prichard, Hutchinson, & Wilson, 2014; Moreno et al.,
2012; Pegg, O'Donnell, Lala, & Barber, 2017; Ridout et al., 2012; Rodriguez, Litt,
Neighbors, & Lewis, 2016; Stoddard et al., 2012; Thompson & Romo, 2016;
Westgate et al., 2014). Two of the aforementioned studies suggested that among
women the association between exposure to alcohol on social media and alcohol use
may be explained by common alcohol-related cognitions (Boyle et al., 2016; Miller et

al., 2014). In the majority of studies the association between disclosure/exposure to prevailed even when potential common factors were controlled for. It should be noted that no previous study has controlled for the combination of multiple potential common explanatory factors of the association between disclosure/exposure and alcohol use.

Several scholars have argued that the association between disclosure/exposure and alcohol use, may be explained by high alcohol use leading to both increased disclosure of and exposure to alcohol on social media (Boyle et al., 2016; D'Angelo, Kerr, et al., 2014; Huang, Soto, et al., 2014). Self-presentation on social media seems to reflect actual alcohol behaviour to some extent, were individuals that drink more share more alcohol content on social media (Geusens & Beullens, 2016b; Westgate & Holliday, 2016; Westgate et al., 2014). Exposures to alcohol on social media may be determined by the individual's alcohol habits as well, as individuals with elevated alcohol use, as previously noted, tend to have an attentional bias towards alcohol stimuli and befriend individuals with similar alcohol habits online (Boyle et al., 2016; Field et al., 2004; Huang, Soto, et al., 2014). Longitudinal studies may give the best indication to whether the association between disclosure/exposure of alcohol on social media and alcohol use is explained by disclosure/exposure reflecting alcohol use. No longitudinal study has this far investigated if disclosure of alcohol-related content on social media could predict later alcohol use, when baseline alcohol use is controlled for. A few longitudinal studies have, however, investigated whether exposure to alcohol on social media can predict later alcohol use, when controlling for baseline alcohol use (Boyle et al., 2016; Huang, Soto, et al., 2014; Huang, Unger, et al., 2014). The results from these studies are mixed with one study suggesting that the association between exposure and later alcohol use could be explained by baseline alcohol use (i.e. due to friendship selection processes) and two studies suggesting that the association between exposure and later alcohol use could not simply be explained by own alcohol use.

Disclosure or exposure as instigators of further alcohol use has received much theoretical attention. Particularly have pathways through which exposure to alcohol-

related content may influence further use, been theoretically discussed. Disclosure of alcohol-related content on social media could potentially lead to subsequently increased alcohol use through mechanisms of self-fulfilling prophecies or positive reinforcement. Human seems to be motivated to perceive themselves, and be perceived as a coherent self through different situations (Bem, 1972; D'Angelo, Kerr, et al., 2014). Accordingly, disclosing alcohol-related content may make the individual more likely to continue to drink in offline settings as well in order to maintain coherence (D'Angelo, Kerr, et al., 2014). In addition, alcohol-related content tends to receive positive virtual feedback; this feedback may enhance further drinking and disclosing through operant reinforcing mechanisms (D'Angelo, Kerr, et al., 2014; Groth et al., 2017; Skinner, 1953). Exposure to user-generated alcohol-related content has been argued to influence alcohol use as well (Moreno et al., 2010). Exposure to user-generated alcohol-related content on social media may strengthen perceived norms for alcohol use and other alcohol-related cognitions (e.g. alcohol enhancement beliefs) through social influence mechanisms (Boyle et al., 2016). Stronger/more positive alcohol-related cognitions may further increase alcohol consumption, as alcohol-related cognitions seem to be an important determinant of alcohol use (Carey, 1995; Perkins, 2007). Some of the potential effect exposure may have on alcohol-related cognitions, and hence alcohol use, could also be independent of social influence, as the mere exposure to a stimulus (e.g. alcohol) is believed to result in more positive evaluations of the stimuli (Zajonc, 1968). One longitudinal study found that alcohol disclosures on social media can predict later binge drinking, but this study did not control for potential confounders (e.g. baseline alcohol use) that may explain the relationship between disclosure and later alcohol use (D'Angelo, Kerr, et al., 2014). The study can therefore only give a limited indication of causality and directionality. Three longitudinal studies have investigated the relationship between exposure to user-generated alcohol content and later alcohol use. Two of these indicated that exposure to user-generated content could lead to an increase in subsequent alcohol use (Boyle et al., 2016; Huang, Unger, et al., 2014), while the third study did not find such an effect (Huang, Soto, et al., 2014). Further, two experimental studies supports the claim that alcohol-related exposure on social media

could contribute to an increase in later alcohol use. The results from these studies suggests that alcohol exposures on social media can skew the perceived norms for alcohol use and result in more lenient alcohol-related cognitions (e.g. more positive alcohol attitudes) in general (Fournier et al., 2013; Litt & Stock, 2011). Exposure to alcohol on social media may thus lead to increased alcohol use, as more lenient alcohol-related cognitions could result in increased alcohol consumption (Perkins, 2007; Wood et al., 1992).
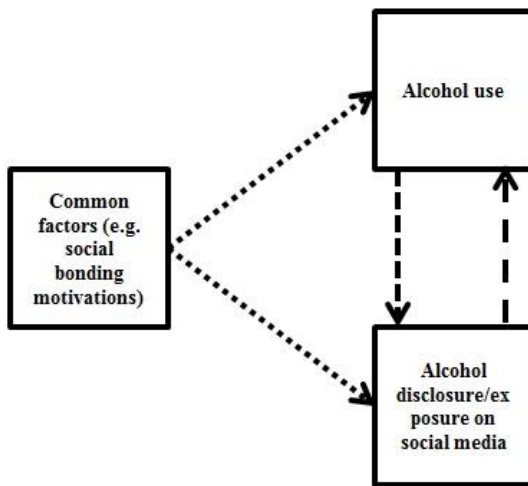
Figure 2 Potential causal relationships between alcohol use and disclosure/exposure (different pathways are illustrated by different dash types)

The relationship between disclosure/exposure and alcohol use could be influenced by the type of alcohol-related content shared or seen (Groth et al., 2017; van Hoof, Bekkers, & van Vuuren, 2014; Westgate & Holliday, 2016). One could for instance argue that content illuminating positive consequences of alcohol use (e.g. social cohesion) may exert a greater influence on the viewers' alcohol use, compared to content illuminating unpleasant consequences of alcohol use (e.g. hangovers). The claim that content referring to positive consequences of alcohol may exert a greater influence over the viewers' alcohol use is supported by social learning theory which suggests that observing others conducting and being rewarded for a behaviour (e.g. drinking rewarded by social cohesion) would increase the likelihood of imitation

while viewing others being punished for a behaviour (e.g. drinking followed by hangovers) would decrease the likelihood of imitation (Bandura, 1965). Only a few studies have investigated how different types of alcohol-related content relate to alcohol use. These studies have reported on the relationship between disclosure and alcohol use, and have suggested that sharing content which indicates excessive alcohol use is a stronger predictor of high alcohol use compared to content suggesting more moderate consumption (Moreno et al., 2010; Moreno et al., 2012; van Hoof et al., 2014).

1.2.3 Disclosure/exposure in the student-population

Alcohol seems, as previously described, to have a prominent role in college/university students' lives (O'Malley & Johnston, 2002; Slutske et al., 2004). User-generated alcohol-related content have also been argued to be more conspicuous among college/university students (D'Angelo, Zhang, Eickhoff, & Moreno, 2014). There are currently few estimates regarding the prevalence of alcohol disclosure and exposure on social media among students. One study among North-American students found that 75% of the students using both Facebook and Twitter displayed alcohol-related content on one of these sites (Moreno, Arseniev-Koehler, Litt, & Christakis, 2016). Another study found that North American undergraduate students reported to view user-generated alcohol-related content between "less than once a month" and "monthly", on average (Westgate et al., 2014). Some studied have suggested that students' may increase their disclosure of alcohol-related content after enrolment to higher education, which supports the claim that alcohol-related social media content may have a special role in student culture (Moreno et al., 2014; Pumper & Moreno, 2013). User-generated alcohol content on social media may be more widespread among students for several reasons. For one, sharing and viewing alcohol-related content could be a way of bonding with others and express identity (D'Angelo, Kerr, et al., 2014; Hebden et al., 2015). Formatting identity and social relationship is further important for students (Borsari et al., 2007; Pittman & Richmond, 2008). In addition, young adults, like the typical students, may be more likely to be heavy users of social media use in general (Statistisk sentralbyrå

[Statistics Norway], 2016). Students may hence disclose and be exposed to alcohol on social media more frequently than other populations due to their increased participation in social media (Boyle et al., 2016). In addition to possibly sharing and viewing more alcohol-related content, students have also been argued to be more likely to be influenced by such content. Some authors have argued that exposure to alcohol-related content may exert a greater influence on students' alcohol use as students may be particularly attentive towards stimuli that could give them an indication of the norms for alcohol use in their new college/university environments (Moreno et al., 2014).

1.3 Limitations with previous research

The main research question in the field of user-generated alcohol-related content on social media has been how such content relates to alcohol use. Determinants of disclosure and exposure, and the effect of different type of alcohol-related content on alcohol use, have received far less attention. The main body of research on disclosure/exposure of user-generated alcohol content is further limited to one particular social media site, namely Facebook, while alcohol disclosure and exposure on other social media sites and apps have been far less studied (Boyle et al., 2016). Further, much of the research on the specific content in alcohol-related posts have been based on content analysis, which is a mode of measurement with several strengths but which also precludes insight in social media users' own perceptions of alcohol-related content. The vast majority of studies investigating the relationship between disclosure/exposure and alcohol use have employed cross-sectional designs, which precludes conclusions regarding directionality and causality (Gupta, Pettigrew, Lam, & Tait, 2016). Some longitudinal and experimental studies have, however, been conducted (Boyle et al., 2016; D'Angelo, Kerr, et al., 2014; Fournier et al., 2013; Huang, Soto, et al., 2014; Huang, Unger, et al., 2014; Litt & Stock, 2011). The greatest limitation with the previous longitudinal studies is that they have not included the range of third variables that may determine both disclosure/exposure and alcohol use. The two experimental studies which have investigated exposure to

alcohol on social media's effect on alcohol-related cognitions, also involves some limitations. The most important limitation with the experimental studies seems to be that the participants viewed the fictitious profiles of unknown individuals (Fournier et al., 2013; Litt & Stock, 2011). The use of fictitious profiles is a limitation, as the potential influence of alcohol exposure has been argued to be particularly related to the fact that social media users can watch alcohol displays generated by known friends and peers (Moreno et al., 2014). Another limitation with the experimental studies is that alcohol-related cognitions were measured directly after the exposure to the fictitious alcohol profiles and none of the studies measured following alcohol consumption (Fournier et al., 2013; Litt & Stock, 2011). The experimental studies can therefore not provide an indication of how exposure relates to alcohol use and alcohol-related cognitions in a longer timeframe.

2. MAIN AIMS

This thesis aims to investigate determinants of disclosure/exposure, through the identification of demographic, personality, alcohol-related cognitions, alcohol use, and social media use factors associated with sharing and seeing alcohol on social media. A second aim is to investigate the relationship between disclosure/exposure of different types of alcohol-related content and further alcohol use, and to investigate potential explanations to this relationship. The research field was largely unexplored when the current PhD-project was planned, and the field is still in its infancy. Hence, the thesis represents a rather exploratory approach, rather than a theoretical foundation.

2.1 Objectives in paper 1

Disclosure of alcohol-related content was the topic in paper 1. The paper had three main aims: i) To investigate extent and frequency of disclosure, ii) To investigate how the sender interprets the alcohol-related content (e.g. as a reflection of high or low alcohol consumption, as a reflection of positive or negative aspects of alcohol use), and iii) To identify factors (i.e. demographical and personality characteristics, alcohol-related cognitions, social media use, and alcohol use) associated with disclosure.

2.2 Objectives in paper 2

Exposure to alcohol-related content was the main subject in paper 2. Paper 2 had three main aims: i) To investigate extent and frequency of exposure, ii) To investigate how the receivers interpret the alcohol-related content, and iii) To identify characteristics associated with exposure to alcohol-related content.

2.3 Objectives in paper 3

Paper 3 used longitudinal data to investigate the relationship between disclosure/exposure and alcohol use. Paper 3 had two main aims: i) To investigate the degree of which disclosure and exposure could predict later alcohol use, and ii) To identify important covariates in the relationship between disclosure/exposure and later alcohol use. A range of covariates were controlled for in the examination of whether disclosure/exposure could predict later alcohol use. In paper 3 it was assumed that if disclosure and/or exposure could predict later alcohol use, even if a range of covariates were controlled for, this could indicate that disclosure/exposure may cause later alcohol use. On the other hand, if the association between disclosure/exposure and further alcohol use ceased to exist when certain covariates were controlled for, this would suggest that these covariates may better explain the relationship between disclosure/exposure and later alcohol use.

3. METHODS

3.1 Procedure

The administrations at the four largest institutions for higher education in Bergen, Norway, permitted us access to the e-mail addresses to all students registered at these institutions (fall 2015). Consequently, these students were invited per e-mail to participate in a web-based survey during fall 2015. The non-responding students were sent up till two reminders per e-mail. A total of 28, 553 e-mails were sent out, of which 11, 236 (39.4%) agreed to participate. The participants from the first survey (T1) were invited to participate in a follow-up survey (T2) during fall 2016. This survey was web-based as well, and the invitations were sent per e-mail. Non-responders were sent up till three reminders. A total of 5, 217 (51.5%) agreed to participate in the follow-up survey (1, 100 e-mails was not delivered). A large proportion of the participants from T1 may not have received the invitation to participate in the follow-up, as they were contacted by their student e-mail account and approximately 40.0% of students in Bergen end their education yearly. The response rate among the students that actually received an invitation is therefore likely to be significantly higher than 51.5% for the follow-up survey. Prizes for participation were included in both surveys to increase response rate. For each of the surveys the participants could win two iPhone 6s/7 and 500 gift cards with a value of 500 NOK (approximately 50 GBP). Participants were also given automatically generated feedback on their alcohol consumption and personality traits.

3.2 Sample

The sample in paper 1 and 2 was identical, and consisted of the 11, 236 students that participated in the first survey. The *n* was lower in some of the analyses due to non-response on some of the variables included. The sample in paper 1 and 2 consisted of 63.3% women, 92.4% were born in Norway, and the sample's mean age was 24.9 years (SD = 6.5 years). The sample had a mean AUDIT-score of 8.2 (SD =

4.9). The sample in paper 3 consisted of the 5, 217 individuals that participated in both the first and the follow-up survey. The *n* varied somewhat in this paper as well due to non-response on some of the variables included in the analyses. The sample from paper 3 consisted of 64.8% women, 92.7% who were born in Norway, and the sample's mean age was 24.8 years at T1 (SD = 6.3 years). The sample in paper 3 had a mean reduction in AUDIT-from time 1 to time 2, of 0.6 points (SD = 3.0). A drop-out analysis, comparing participants from both surveys to participants that only participated in the first survey, was conducted in paper 3. The drop-out analysis yielded few, and only very small, significant differences between the two samples.

3.3 Measures

All the items included in the survey were in Norwegian. A pilot survey was conducted where approximately ten persons tested the item's clarity and relevance before the data collection was conducted.

Demographics were measured by the following questions at T1: "Year of birth?" (response range: 1940-2000), "Biological sex?" (woman; man), "Where were you born?" (Norway; Nordic country, outside of Norway; European country, outside of the Nordic countries; Asia, Africa, Central- or South-America; North-America, Oceania; I don't know), "Which religious belief are you currently affiliated with?" (Buddhism; Hinduism; Islam; Jewism; Catholic Christianity; Orthodox Christianity; Protestant Christianity; Other religion; I do not identity myself with any religious belief). In both surveys the participants received questions regarding relationship and parental status: "Relationship status?" (single; I have a steady boy/girlfriend, but I live alone; cohabitant; married/registered partnership; other), and "Do you have children?" (no; yes). In addition, the participants in the follow-up survey were asked: "Have you changed educational institution the last year?" (yes; no; I'm no longer a student). Several of the demographic questions were gathered from Nedregård and Olsen (2014), the validity and reliability of these items have not been investigated.

The Five-Factor Model's personality traits (i.e. extroversion, agreeableness, conscientiousness, neuroticism, and openness) were measured at T1 with the Mini-International Personality Item Pool (Mini-IPIP) (Donnellan et al., 2006). This scale has been found to be effective, valid and reliable for personality assessments (Donnellan et al., 2006). The Mini-IPIP consists of 20 items (i.e. 4 items for each trait), where the responders are asked to rate the degree of which statements regarding typical behaviour applies to their behaviour. Response alternatives range from "very wrong" to "very right". Examples of items in the Mini-IPIP includes: "I talk to several people when I attend parties etc.", "I am emphatic to other people's feelings", "I get my chores done rapidly", "I often experience mood swings", and "I have a vivid imagination". Total scores range between 5 and 20 for each trait. The internal reliability of the measurements in the current study was acceptable. The items measuring extroversion had a Cronbach's alpha of .83, the Cronbach's alpha for the items measuring agreeableness was .77, the Cronbach's alpha for the items measuring conscientiousness was .69, the Cronbach's alpha for the items measuring neuroticism was .75, and the items measuring openness had a Cronbach's alpha of .74. A Cronbach's alpha of .70 or higher is often considered as acceptable, but there is not a clear consensus regarding which cut-offs represents acceptable Cronbach's alphas as this will depend on several factors (e.g. number of items included) (Bernardi, 1994; Cicchetti, 1994; DeVellis, 2012; Tavakol & Dennick, 2011). The trait *self-monitoring* (i.e. the degree to which a person manages his or her self-presentation according to situational cues) was measured with the revised Self-monitoring scale (Lennox & Wolfe, 1984; Snyder, 1974). The scale is found to be a reliable and valid measure of self-monitoring (O'Cass, 2000). The revised Self-monitoring scale consists of 13 items, where the respondents are asked to judge whether different statements describes their typical behaviour. Response alternatives range from "certainly always false" to "certainly always true". "I am often able to read other people's true feelings in their eyes" and "I have the ability to manage other's impression of me according to how I want to be perceived" are examples of statements included in the revised Self-monitoring scale. Total scores scale range between 0 and 65. The internal reliability of this scale was acceptable, with a Cronbach's alpha of .82.

Alcohol use was assessed at T1 and T2 with the Alcohol Use Disorders Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Bohn et al., 1995). AUDIT is a widely used, reliable and valid scale measuring different aspects of alcohol use (i.e. alcohol consumption, alcohol-related problems, and dependency symptoms) (Reinert & Allen, 2007). The respondents are asked to assess their own alcohol use the past year and indicate how often they consume alcohol, how many alcohol units they drink on a typical drinking occasion, how often they drink more than six alcohol units, and how often they experience different adverse consequences related to their alcohol use (e.g. problems controlling consumption, feelings of guilt). Total scores range between 0 and 40, where a score on or above 8, 16, or 20 has been suggested to indicate hazardous, harmful or dependent alcohol use, respectively (Babor et al., 2001). The Cronbach's alpha for AUDIT was .78 (T1). The Cronbach's alpha for AUDIT at T2 was .79. The measurement of alcohol use at T1 correlated strongly with the alcohol use measurements at T2, with a Pearson correlation of .80.

Alcohol-related cognitions (i.e. prototypic evaluations of the typical high-intake drinker and the typical sharer of alcohol-related content on social media, and descriptive norms for alcohol use among co-students and online-friends) were measured at T1. Prototypic evaluations was measured with the following questions: "What is your overall impression of the typical student that": a) "drinks 6 alcohol units or more on a regular drinking night?", and b) "posts alcohol-related content on SNSs (e.g. party pictures)?" Response alternatives ranged from one (extremely negative) to ten (extremely positive) (Gibbons & Gerrard, 1995; Todd & Mullan, 2011). This mode of prototypic evaluation assessment is widely used, and the measurement has been found to predict a range of behaviours, but the psychometric properties of the items are not thoroughly investigated (Gerrard et al., 2008; Gibbons & Gerrard, 1995). Descriptive norms were measured by the following questions: "Think about the five students you know best. How many of them do you think drink": a) "alcohol a couple of times a week?", b) "10 alcohol units or more on a typical drinking occasion?", and c) "6 alcohol units or more (on the same occasion) a

couple of times a week?" (response range: 0-5 students). For the assessment of descriptive norms for alcohol use among online-friends the respondents were asked to think about the five individuals of whom they see most social media content from. The questions regarding descriptive norms were based on items used in two surveys conducted by Miller et al. (2014) and Tickle, Hull, Sargent, Dalton, and Heatherton (2006), and is similar to the first three questions of AUDIT (although AUDIT ask about the respondent's own alcohol use). The answers to the three questions regarding descriptive norms for alcohol use among co-students and among online-friends were summarized. Total scores on descriptive norms for alcohol use among co-students and online-friends thus ranged between 0 and 15, respectively. The psychometric properties of the descriptive norm scales have not been scientifically tested. In the current study the Cronbach's alpha for descriptive norms for alcohol use among co-students was .69 and the Cronbach's alpha for descriptive norms for alcohol use among online-friends was .72.

Social media use was measured at T1 by the items: "Do you have an account on an SNS?" (yes; no), "How long have you had an account on an SNS?" (less than 6 months; 6 months-1 year; 1-2 years; 2-3 years; over 3 years), "How often do you log on to SNSs?" (seldom/never; less than 1 time a week; 1 time a week; 2-3 times a week; 4-6 times a week; 1-2 times a day; over 3 times a day), "About how many friends or followers do you have on the SNS you use the most?", and "Which SNSs do you use (you can select several sites)?" (Facebook; Twitter; Instagram; Myspace; Tinder; Snapchat; Jodel; Kik; None; Others) (Karl et al., 2010). The validity and reliability of the social media use items have not been tested.

Disclosure and exposure of alcohol on social media was assessed at T1. The participants were first asked: "Have you ever posted something on SNSs that were related to alcohol?" (yes; no). The participants that answered "yes" received several subsequent questions regarding alcohol-related disclosure. "How often do you post content (text or images) on SNS that": a) "Are related to alcohol?", b) "Implies that you drink a few units for relaxation and/or taste?", c) "Implies that you drink several units on a social gathering?", d) "Implies that you drink on weekdays?", e) "Implies

that you drink alone (e.g., before going to a party)?", f) "Refers to positive consequences of using alcohol (e.g., increased pleasure, social cohesion, relaxation)?", and g) "Refers to negative consequences of using alcohol (e.g., hangovers, loss of control, hangover anxiety)?" (Response alternatives: Never; I`ve done it before, but not lately; less than once a month; every month; a couple times a month; every week; a couple times a week; daily or almost daily). Exposure to user-generated alcohol-related content was measured by similar questions as disclosure, but for these questions the respondents were asked to assess how often they saw different types of alcohol-related content on social media. The respondents were instructed to think of alcohol content which was visible for more than two persons before answering the questions regarding disclosure and exposure. When answering the questions regarding exposure, the respondents were asked to only think of social media content sent on the sites/apps of known others (i.e. not marketing etc.). The questions regarding disclosure and exposure were developed for this survey, specifically, and their psychometric properties were not tested beyond checking for face validity in the pilot trial.

3.4 Statistical analyses

The data analyses were conducted in IBM SPSS Statistics for Windows, Version 23 (IBM Corp., Armonk, NY), and Mplus, Version 7.4 (Muthén & Munthén, 1998-2001). Missing data on independent variables were deleted list wise. The nominal variables used in the analyses were dichotomized before the analyses. The disclosure and exposure variables were ordinal, and these were also dichotomised to make the results easier to comprehend and communicate.

3.4.1 Paper 1

The frequency of which the respondents reported to disclose different types of alcohol-related content on social media was calculated. Further, two binary logistic regression models were conducted. The dependent variables in these regression models was sharing alcohol-related content referring to positive aspects of alcohol

monthly or more often and sharing alcohol-related content referring to negative aspects of alcohol monthly or more often. The reference categories for the dependent variables were sharing positive/negative alcohol content more rarely than once a month. The independent variables were demographic characteristics (i.e. sex, place of birth, religious identification, relationship status, age, and parental status), personality traits (i.e. extroversion, agreeableness, conscientiousness, neuroticism, openness, and self-monitoring), alcohol use (i.e. AUDIT-score), alcohol-related cognitions (i.e. prototypic apprehension of the typical drinker and of the typical sharer of alcohol content on social media, and descriptive norms for alcohol use among co-students and online-friends), and general and alcohol-related social media use (i.e. number of online-friends and reported frequency of exposure to content referring to positive and negative aspects of alcohol). The nominal variables were dichotomised into: Woman vs. man, born in Norway vs. born outside of Norway, religious vs. nonreligious, in a relationship vs. single, and have children vs. do not have children. The continuous variables were computed into z-scores before the regression models. The relationship between the dependent and the independent variables were reported as odds ratios (OR). OR is considered as an effect size, but different authors suggest different definitions of what constitutes a small, moderate, and large effect. In addition, the interpretations will vary based on the rate of the outcome of interest (Chen, Cohen, & Chen, 2010; Durlak, 2009; J. A. Rosenthal, 1996). J. A. Rosenthal (1996) suggests that ORs of 1.5, 2.5, 4.0, and 10.0 could be considered as representing small, moderate, large, and very large effect sizes, respectively.

The basic assumptions of logistic regression models were tested before we conducted the analyses in paper one. Pallant (2013) suggests that a tolerance value of less than .1 would indicate a multicollinearity issue in logistic regression models. None of the independent variables had such a tolerance value. Pallant (2013) further suggests that residuals with a z-score above 2.5 would suggest that these cases are outliers. According to Pallant (2013)'s guidelines 263 cases could be considered as outliers in the regression model where disclosure of alcohol-related content reflecting positive aspects of alcohol use was the dependent variable and 140 cases could be considered as outliers in the regression model where disclosure of alcohol-related

content reflecting negative aspects of alcohol use was the dependent variable. These outliers were included in the analyses, but they are unlikely to have affected the results of the analyses given the large dataset.

3.4.2 Paper 2

The frequency of which the respondents reported to see different types of user-generated alcohol content on social media was calculated. Further, we conducted two binary logistic regression analyses. The dependent variables for these regression models was seeing user-generated content referring to positive aspects of alcohol monthly or more often and seeing content referring to negative aspects of alcohol monthly or more often. The reference categories for the dependent variables were seeing positive/negative alcohol content more rarely than once a month. The independent variables were for the most part identical to the independent variables used in paper one. Disclosure of content reflecting positive and negative aspects of alcohol use was, however, independent variables in the regression analyses in paper two, as opposed to dependent variables in paper one. Frequency of logins to social media was included as an independent variable in paper two (this variable was not included in paper one). The associations between the independent and dependent variables were reported as ORs.

The correlations between the independent variables did not suggest multicollinearity according to Pallant (2013)'s guidelines for assessing multicollinearity when conducting logistic regression analyses. There were 285 outliers in the regression model with exposure to content reflecting positive aspects of alcohol and 42 outliers in the regression model with exposure to content reflecting negative aspects of alcohol. These outliers were included in the analyses, but they are unlikely to have affected the results of the analyses given the size of the dataset.

3.4.3 Paper 3

The sample in paper three consisted of the respondents that had participated in both waves of the survey. To clearly visualize how strongly disclosure and exposure

indicate coexisting and subsequent alcohol use the participant who reported frequent (i.e. monthly or more often) disclosure/exposure was compared to the participants who reported less frequent disclosure/exposure with independent t-tests and chi-square tests. Participants that reported frequent disclosure of content referring to positive aspects of alcohol was compared to the participants who did not report this and participants that reported frequent disclosure of content referring to negative aspects was compared to the participants who did not report this. The same was done for the frequent vs. less frequent exposure groups. The groups were compared on AUDIT-scores at T1 and T2, and the proportion in each group that engaged in risky drinking (i.e. AUDIT≥8) at T1 and T2 was compared. Cohen's d and phi coefficients were used as an indication of the effect size of the significant ($p < .05$) group differences. Cohen's ds of .20, .50, and .80 are often considered to suggest small, moderate, and large effect sizes, respectively (Cohen, 1988). How phi coefficients should be interpreted is not obvious, as the index is clearly affected by the distribution of the variables and the maximum possible phi value would differ accordingly (Breaugh, 2003). In paper 3 we considered phi coefficients of .10, .30, and .50 to represent small, moderate, and large effect sizes, respectively (Cohen, 1988). Finally, we conducted several multiple linear regression models. AUDIT-scores at T2 and difference in AUDIT-score between T1 and T2 comprised the dependent variables. The four independent variables of interest were frequent disclosure and frequent exposure of content reflecting positive and negative aspects of alcohol use. Demographics (i.e. age, sex, place of birth, religious identification, relationship status, student status, and parental status), personality (i.e. extroversion, agreeableness, conscientiousness, neuroticism, intellect/imagination, and self-monitoring), social media use (i.e. frequency of logins to social media, number of online-friends, and having a Snapchat account), alcohol use at T1 (i.e. AUDIT-score), and alcohol-related cognitions (i.e. prototypic apprehension of the typical heavy drinker and of the typical sharer of alcohol-related content, and descriptive norms for alcohol use among co-students and online-friends) were controlled for in some of the regression models. All the independent variables were measures at T1, except for relationship and parental status (T1 and T2), and student status (T2). Different blocks

of independent variables were controlled for one block at a time. The first regression models were crude, where only alcohol disclosure and exposure variables were included as independent variables. Demographic and personality variables were entered in the second regression models. Social media use and the other disclosure/exposure variables were controlled for in the third regression model. Alcohol use at T1 was included in the fourth regression models, while alcohol-related cognitions were controlled for in the fifth regression models. Finally, a regression model including all variables was analysed. The relationship between the independent variables and the dependent variables were reported as standardised betas to give an indication of effect size. According to Cohen (1988) completely standardised betas of .10, .30., and .50 represents small, moderate, and large effect sizes respectively.

Assumptions for conducting linear regression analyses were tested before the regression analyses. The analyses did not violate the assumptions regarding collinearity, outliers, normality, linearity, homoscedasticity, or independence of residuals to such a degree that it would affect the results of the regression models.

3.5 Ethics

The study was conducted according to the principles expressed in the Declaration of Helsinki. The project was approved by the Regional Committee for Medical and Health Research Ethics, Western Norway (no. 2015/1154). In the beginning of each survey the participants were met with an informed content page, were they could choose whether or not they agreed to participation. The informed content page included information regarding the purpose and methods of the project, advantages and potential disadvantages related to participation, routines for data storage, their right to abstain from participation, and the researcher's contact information. To ensure anonymity all identifiable data (i.e. e-mail addresses, social security number, and student identification numbers) were stored separately and locked down in steel cabinets. Participants were also provided with the contact information of the researchers (all clinical psychologist) and mental health services by the end of the surveys, and they were encouraged to contact some of these agents

if they experienced any concerns regarding their use of alcohol or drugs, or their mental health.

4. RESULTS

All the below mentioned associations were statistical significant at $p < .05$.

4.1 Paper 1

A total of 71.0% (95% CI = [70.1%, 71.9%]) of the participants reported having posted something related to alcohol on social media, but few reported to do so monthly or more often. The participants reported to share alcohol-related content with positive connotations (i.e. relaxation, social gatherings, and content highlighting positive aspects of alcohol) more frequently than content referring to negative aspects or alcohol or content which implied solo-drinking.

Several factors were associated with frequent (i.e. monthly or more often) disclosure of content referring to positive or negative aspects of alcohol. Women and participants with lower openness scores were more likely to report frequent disclosure of content referring to positive aspects of alcohol use. Higher scores on neuroticism was associated with an increased likelihood of reporting frequent disclosure of content referring to negative aspects of alcohol use. Single, young, and extroverted individuals had further an increased likelihood of reporting frequent disclosure of content referring to positive as well as content referring to negative aspects of alcohol use. The number of online-friends was negatively associated with frequent disclosure of content referring to positive aspects of alcohol. The perceived level of exposure to alcohol-related content was positively associated to own disclosures of alcohol content. This relationship was content specific, where participants who reported frequent exposure to content referring to positive aspects of alcohol were more likely to report frequent disclosure of similar content, and vice versa for content referring to negative aspects. Alcohol-related cognitions were also related to disclosure. Perceived norms for alcohol use among co-students was positively associated with frequent disclosure of content referring to positive aspects of alcohol. Favourable prototype evaluations of the typical sharer of alcohol content were positively associated with disclosure of content referring to both positive and

negative aspects of alcohol. Finally, elevated alcohol use was associated with an increased likelihood of reporting disclosure of content referring to both positive and negative aspects of alcohol. All of the associations between the different factors and disclosure had small or very small effect sizes according to J. A. Rosenthal (1996)'s suggestions for ORs interpretation, with the exception of the association between perceived frequency of exposure to content referring to negative aspects of alcohol and frequent disclosure of similar content which had a moderate effect size. The results suggested that the included independent variables could explain about 33.8% (Nagelkerke R^2) of the variance in disclosure of content referring to positive aspects of alcohol. The independent variables could further explain 33.2% (Nagelkerke R^2) of the variance in disclosures of content referring to negative aspects of alcohol. Nagelkerke R^2 is often the preferred index for explained variance estimates (Bewick, Cheek, & Ball, 2005).

4.2 Paper 2

A total of 96.7% (95% CI = [96.3%, 97.0%]) of the participants reported to have seen user-generated alcohol content on social media. Frequent (i.e. monthly or more often) exposure to some type of alcohol content was reported by the majority. The alcohol-related content the participants viewed were interpreted in a similar fashion as the alcohol content they themselves shared on social media, i.e. reports of frequent exposure to alcohol content with positive connotations were more common than reports of frequent exposure to alcohol content with negative connotations.

Several demographic and personality characteristics were associated with reports of frequent exposure. The younger and Norwegian born participants were more likely to report frequent exposure to content depicting positive and negative aspects of alcohol, compared to older participants and participants born outside of Norway. Nonreligious participants were more likely to report frequent exposure to content depicting positive aspects of alcohol, and less likely to report frequent exposure to content depicting negative aspects. Extroversion was negatively associated with frequent exposure of content depicting positive aspects, while

agreeableness scores were positively associated with frequent exposure of content depicting positive aspects. Elevated self-monitoring scores were associated with an increased likelihood of reporting frequent exposure to content reflecting both positive and negative aspects of alcohol. Frequent exposure was also related to some of the social media variables included. The participants who reported frequent exposure had more online-friends, logged in to social media more frequently, and were more likely to report disclosure of alcohol-related content on social media. Of the alcohol-related cognitions included, frequent exposure was associated with stronger perceived norms for alcohol use among online-friends and the prototypic assessment of the typical sharer of alcohol content on social media. The favourability of the prototypic evaluation of the typical sharer was positively associated with exposure to content reflecting positive aspects of alcohol and negatively associated with frequent exposure to content reflecting negative aspects of alcohol. Elevated alcohol use was positively associated with reports of frequent exposure to content referring to both positive and negative aspects of alcohol. The associations had mainly small or very small effect sizes, but the association between disclosure of content reflecting positive aspects of alcohol and exposure to similar content had a moderate effect size (J. A. Rosenthal, 1996). The included independent variables could explain about 23.6% (Nagelkerke R^2) of the variance in frequent vs. infrequent exposure to content depicting positive aspects of alcohol variable, and 16.0% (Nagelkerke R^2) of the variance in frequent vs. infrequent exposure to content depicting negative aspects of alcohol variable.

4.3 Paper 3

The participants who reported to see and share alcohol-related content frequently had higher alcohol consumption at T1 and T2 compared to the participants who reported less frequent alcohol disclosure and exposure. Between 81.8-93.1% of the participants who reported frequent disclosure of content depicting positive or negative aspects of alcohol had an alcohol consumption which is considered as risky/hazardous (AUDIT≥8) at T1 and T2. The participants who reported frequent

disclosure of content referring to negative aspects of alcohol, or frequent exposure of content referring to positive or negative aspects of alcohol had a significant reduction in alcohol use from T1 and T2, compared to the respective less frequent disclosure/exposure groups.

The results from the regression models suggested that controlling for each of the different blocks of covariates (i.e. demographic and personality characteristics, social media use and disclosure/exposure, alcohol use, and alcohol-related cognitions) weakened the relationship between disclosure/exposure at T1 and alcohol use at T2. Controlling for baseline alcohol use resulted in the greatest weakening of the association between disclosure/exposure and alcohol use at T2. The association between disclosure of content depicting positive aspects of alcohol and alcohol use at T2 was the only one which remained significant when all included covariates were controlled for, although the effect size was very small. When all covariates were controlled for, the participants who frequently disclosed content referring to positive aspects of alcohol use had a small increase in alcohol use at T2 (i.e. 0.64 AUDIT-points), compared to the participants who reported to do this less frequently.

5. DISCUSSION

In summary this thesis' results suggest that Norwegian students share alcohol-related content on their social media quite infrequently, while exposure to such content is far more common. Both the senders and the viewers of alcohol content on social media commonly interpret alcohol social media content to reflect positive aspects of alcohol use or the setting where alcohol is enjoyed. Disclosure/exposure of alcohol is more common among individuals with certain characteristics (e.g. demographical characteristics, personality traits, and social media habits). Frequent disclosure and frequent exposure of alcohol-related content on social media can indicate alcohol use. The current results indicate that the relationship between alcohol disclosure/exposure on social media and alcohol use may primarily be explained by high alcohol use resulting in more alcohol disclosure and exposure. The current results suggest, however, that disclosure in particular, may have a small causal influence on further alcohol use.

Most of the observed associations had small or very small effect sizes, but it could be argued that even small effect sizes could be meaningful when the outcome variable is important (theoretically or practically) (Breaugh, 2003; Prentice & Miller, 1992) and when the effect apply to large proportions of the population. Alcohol use can greatly affect both the individual and society (Corrao et al., 2004; Hingson et al., 2002; Rehm et al., 2009; Rehm et al., 2003). Given the impact of alcohol, the identification of determinants of alcohol use (e.g. disclosure/exposure) could thus be of theoretical and practical importance, even if the effect sizes of these determinants are small. Likewise, identifying potential determinants of disclosure/exposure could also be important, even if the associations are small, as knowledge regarding motivations for disclosure/exposure could shed a light on the relationship between disclosure/exposure and alcohol use. In addition, it should be taken into consideration that the interpretation of ORs (i.e. reported in paper 1 and 2) as an effect size is not clear-cut. In this regard it should be noted that common outcomes (e.g. exposure to alcohol in paper 2) tend to result in smaller ORs (Chen et al., 2010; Nemes, Jonasson, Genell, & Steineck, 2009).

5.1 Determinants of disclosure/exposure

A range of factors were associated with frequent disclosure and frequent exposure to alcohol on social media. The characteristics that were associated with frequent disclosure/exposure were: i) Certain demographic and personality characteristics, ii) Increased social media investment, iii) Lenient alcohol-related cognitions, and iv) High alcohol use. The figures and the hypotheses presented in the introduction are largely supported, but the current results suggest that disclosure and exposure may be explained by somewhat different determinants. Both disclosure and exposure were related to elevated alcohol use and lenient alcohol-related cognitions, but disclosure of alcohol may in some instances be negatively associated with excessive social media use, while the opposite seems to be true for exposure. Disclosure of alcohol content seemed to be more common among individuals sharing demographic and personality characteristics which are associated with elevated alcohol use and certain self-presentation motives, such as being single and extroverted. Exposure to alcohol on social media was on the other hand was more consistently associated with traits which have been linked to an increased interest and awareness of other people's behaviour, such as higher agreeableness and self-monitoring scores.

5.1.1 Demographic and personality characteristics

A range of demographic and personality characteristics were associated with an increased likelihood of reporting frequent disclosure or frequent exposure of user-generated alcohol content on social media. Demographical and personality characteristics are often viewed as relatively stable traits (McCrae & John, 1992), hence it is reasonable to assume that these characteristics were present before the disclosure/exposure of alcohol related content on social media took place. Frequent disclosure and frequent exposure were associated with different demographical and personality characteristics, in fact the two groups had only one such characteristic in common (i.e. younger age). The different demographical and personality profile of the frequent disclosure versus frequent exposure groups suggest that disclosure and

exposure may be motivated by somewhat different factors. A wide range of explanations could be made as to why each demographic or personality characteristic were associated with disclosure or exposure. Possible common explanations are emphasised in the following sections.

Several demographic and personality characteristics were associated with frequent disclosure of alcohol content referring either to positive or negative aspects of alcohol. Women and participants with lower openness scores were more likely to report frequent disclosure of content referring to positive aspects of alcohol. Higher neuroticism scores was associated with an increased likelihood of reporting frequent disclosure of content referring to negative aspects of alcohol. And younger, single, and extroverted participants were more likely to report frequent disclosure of both types of content. Alcohol is often associated with sociability, which is a highly valued trait in western nations (Feiler & Kleinbaum, 2015; Fromme, Stroot, & Kaplan, 1993). Extroverted individuals may disclose more alcohol-related content on social media as a mean of expressing their social nature, while singles may be more motivated to display alcohol use to symbolise sociability and popularity to potential mates. Younger individuals with lower openness scores were also more likely to report frequent disclosure of alcohol-related content on social media. Younger age and lower openness scores are both factors which may be associated with an increased susceptibility to norm adherence (Gardner & Steinberg, 2005; McCrae & John, 1992). The level of exposure to alcohol reported in the current sample was substantial, and younger individuals with lowered openness scores may hence be more likely to disclose alcohol-related content as a way of adjusting to the social norm. Women and individuals with higher neuroticism scores may, on the other hand, be more preoccupied with online social bonding, compared to men and individuals with lower neuroticism scores (Barker, 2009; Hughes, Rowe, Batey, & Lee, 2012; Muscanell & Guadagno, 2012). Their increased orientation towards social bonding on social media may explain why they report more disclosure of alcohol on social media, as sharing alcohol-related content could be a way of bonding with others and gain social support (Hebden et al., 2015; Niland et al., 2014). In addition both women and

individuals with high extroversion and neuroticism scores tend to use social media more excessively than men and people with lower scores on extroversion and neuroticism (Andreassen et al., 2016; Correa, Hinsley, & De Zuniga, 2010; Dhir, Pallesen, Torsheim, & Andreassen, 2016). The increased social media use associated with people possessing these characteristics may also explain their increased likelihood of reporting frequent disclosure of alcohol content. It should further be noted that all the demographical and personality characteristics which were associated with increased disclosure of alcohol-related content, have also been associated with elevated alcohol use (except female sex) (Erevik et al., 2017; Malouff et al., 2007). Individuals tend to befriend others with similar demographic and personality characteristics (Selfhout et al., 2010; Subrahmanyam et al., 2008). Alcohol use may hence be more common and accepted in the frequent disclosures' social network, which may make posting alcohol content more accepted as well, and hence explain the association between these characteristics and frequent alcohol disclosure on social media. Belonging to social networks with high alcohol use may also involve participation in many parties and other settings were alcohol is enjoyed, which would result in more alcohol experiences to post. In summary increased disclosure may be related to a motive of displaying oneself as social and popular, norm adherence, social bonding intentions, and belongingness to demographic/personality groups were high alcohol use is common.

Frequent exposure was also related to a variety of demographical and personality characteristics, although these characteristics were not the same as the ones related to frequent disclosure. Participants who were nonreligious, scored lower on extroversion, and higher on agreeableness were more likely to report frequent exposure to content reflecting positive aspects of alcohol. Religious individuals were more likely to report frequent exposure of content referring to negative aspects of alcohol. Finally, participants who were born in Norway, younger, and had higher self-monitoring scores were more likely to report frequent exposure of content referring to both positive and negative aspects of alcohol. Several of the characteristics which were associated with reports of frequent exposure (i.e. younger age, higher scores on agreeableness and self-monitoring, and lower scores on introversion) have also been

related to an increased interest in others' behaviour. Higher scores on extroversion could be related to attention seeking behaviour while individuals with lower scores could be more likely to take a receiver/observer type of role (Ashton, Lee, & Paunonen, 2002). The current results suggest that this may also be true for disclosure versus exposure to alcohol content on social media. Younger age and self-monitoring are related to an increased use of others' expressions as cues regarding socially approved behaviour, and agreeable individuals are more likely to demonstrate an interest in others as a way of sustaining warm interpersonal relationships (Gardner & Steinberg, 2005; Graziano & Eisenberg, 1997; McCrae & John, 1992; Snyder, 1974). Younger individuals with higher self-monitoring and agreeableness scores, and lower extroversion scores may thus be more attentive towards others in general, and hence be more exposed to alcohol-related content on social media. Participants who were born in Norway were more likely to report frequent exposure to alcohol on social media as well; this finding could be related to the increased alcohol consumption reported by Norwegian born students which may result in a stronger orientation towards alcohol among ethnic Norwegians (Erevik et al., 2017). Religious identification predicted exposure to alcohol-related content, those who identified themselves as religious were more likely to report frequent exposure to content reflecting negative aspects of alcohol use, while they were less likely to report frequent exposure to content referring to positive aspects of alcohol. Religious identification is often associated with an increased likelihood of abstaining from alcohol altogether (Michalak, Trocki, & Bond, 2007). The increased exposure of content interpreted as reflecting negative aspects of alcohol and decreased exposure of content interpreted to reflect positive aspects may be thus explained by religious individuals seeking to confirm preconceived attitudes towards alcohol (Wason, 1968). Some of the demographic and personality characteristics which were associated with frequent exposure (i.e. nonreligious identification, younger age, and being born in Norway), have also been associated with high alcohol use (Erevik et al., 2017). The increased level of exposure reported by these individuals may hence be a result of them belonging to social networks where alcohol use is the norm.

In summary the results regarding demographic and personality characteristics associated with disclosure and exposure of alcohol on social media, may suggest that disclosure of alcohol is more determined by self-presentation motives (e.g. displaying oneself as sociable and conform), while exposure may be more driven by a general interest in others' behaviour.

5.1.2 Increased social media use

The current results suggest that there is an association between more excessive social media use (i.e. more social media friends and more logins to social media) and the level of exposure to alcohol on social media. This result may be quite apparent as more time spent on social media and more individuals to see content from is likely to result in more exposure to all types of social media content (including alcohol-related content). It would be reasonable to assume that excessive social media use would lead to more disclosure of alcohol-related content as well. Frequency of logins to social media was unfortunately not included as an independent variable in the paper investigating determinants of frequent disclosure. The number of online-friends was, however, negatively associated with frequent disclosure, a finding which is at odds with previous ones (Egan & Moreno, 2011; Moreno et al., 2014). Some of the participants had a very large number of online-friends, and the standard deviation of this variable was quite big (i.e. 268.6 online-friends). The participants with a large number of online-friends may be some sort of social media celebrities. Having such a large number of online-friends/followers may result in a more active editing of social media content, were the individual aims to be a role model for their online-followers/friends, thereby avoiding posting alcohol-related content.

Of all the variables included the disclosure and exposure variables showed the strongest association to each other. This relationship may be explained by social learning process, where individuals who sees others post alcohol content becomes more likely to post such content themselves (Bandura, 1965). The exposure variable could also be reckoned as a perceived norm for alcohol-related postings on social media, rather than a measure of actual exposure. The relationship between frequent

disclosure and frequent exposure may hence be explained in a similar fashion as the relationship between other alcohol-related cognitions and disclosure.

5.1.3 Lenient alcohol-related cognitions

Both disclosure and exposure was associated with more lenient alcohol-related cognitions (e.g. descriptive norms for alcohol use and prototype evaluation of typical sharer of alcohol content). Alcohol-related cognitions regarding user-generated alcohol content had a stronger association with disclosure/exposure, than the more general alcohol-related cognitions included (e.g. perceived level of exposure versus perceived norms for alcohol use). This finding is in line with the result of one previous study which also suggested that perceived norms for alcohol-related postings on social media is a stronger determinant of disclosure, compared to perceived norms for alcohol use (Geusens & Beullens, 2016b). The finding that disclosure/exposure is associated with a favourable prototypic evaluation of the typical sharer of alcohol-related content, but unrelated to the prototypic evaluation of the typical heavy drinker is, however, a novel one. The relationship between a favourable prototypic evaluation of posting alcohol content and disclosure/exposure, did not apply for frequent exposure to content interpreted as a reflection of negative aspects of alcohol. Reports of frequent exposure to content reflecting negative aspects of alcohol were actually associated with a more unfavourable prototypic evaluation of posting alcohol content. The fact that alcohol-related cognitions which were specific for the social media setting showed a stronger association with disclosure/exposure compared to general alcohol-related cognitions could suggest that sharing alcohol posts is considered as a behaviour in its own realm which is somewhat separated from alcohol use. The questions regarding evaluations and norms for user-generated alcohol content on social media may, however, detect other aspects of the cognitive evaluations of alcohol use (e.g. the degree to which the individual reckons alcohol use to be a behaviour acceptable for public display).

Lenient alcohol-related cognitions may lead to increased disclosure of alcohol content due to an interest in endorsing to perceived norms and attitudes regarding

alcohol and alcohol postings. Lenient alcohol-related cognitions may further lead to increased exposure on the other hand due to an interest in confirming preconceived beliefs concerning alcohol use and alcohol-related social media behaviour (Wason, 1968). Likewise, individuals with negative prototypic evaluations towards alcohol-related postings may be more likely to notice alcohol content which they perceive to confirm their attitudes towards posting alcohol-related content (i.e. content they interpret as reflecting negative aspects of alcohol). In addition to lenient alcohol-related cognitions leading to increased disclosure/exposure, it has been suggested that disclosure/exposure may lead to more lenient alcohol-related cognitions as well (Boyle et al., 2016; D'Angelo, Kerr, et al., 2014; Rodriguez et al., 2016). The association between disclosure/exposure and lenient alcohol-related cognitions may hence be explained by disclosure/exposure causing more lenient evaluations of alcohol use. This claim is supported by the results from two experimental studies (Fournier et al., 2013; Litt & Stock, 2011).

5.1.4 High alcohol use

A consistent finding in this thesis was that frequent disclosure and exposure are associated with and can indicate elevated alcohol use, a finding which is in line with previous studies (Boyle et al., 2016; Geusens & Beullens, 2016b; Huang, Unger, et al., 2014; Westgate et al., 2014). Potential explanations to the reported association between disclosure/exposure and alcohol use will be discussed in the subsequent sections. It should be noted that some of the high disclosure/exposure groups had a significant decrease in alcohol use, compared to the corresponding less frequent disclosure/exposure groups. This finding could be due to the regression towards mean phenomenon, which is supported by the evaporation of this reduction when baseline alcohol use was controlled for (Bland & Altman, 1994).

5.2 Disclosure/exposure and alcohol use: Cause or correlate?

Paper 3 employed longitudinal data, and could hence provide an indication of directional and causal relationships between disclosure/exposure and alcohol use. The association between disclosure/exposure and alcohol use can, as previously mentioned, be explained by one or a combination of three causal pathways: third variables (e.g. certain demographic or personality characteristics, social media use, or lenient alcohol-related cognitions) predicting both increased disclosure/exposure and alcohol use, high alcohol use causing an increase in disclosure/exposure, or disclosure/exposure influencing further alcohol use (Groth et al., 2017; Moreno et al., 2012; Westgate & Holliday, 2016).

Several of the factors which were associated with disclosure/exposure have also been found to predict high alcohol use (e.g. lenient alcohol-related cognitions, some of the demographical and personality characteristics, and excessive social media use) (Erevik et al., 2017; Malouff et al., 2007; Perkins, 2007; Westgate & Holliday, 2016). Accordingly, the relationship between disclosure/exposure and alcohol use was weakened when these potential cofounders were controlled for. Lenient alcohol-related cognitions and social media use (including other types of disclosure/exposure) appeared to be the most important cofounders in the relationship between disclosure/exposure and later alcohol use. Controlling for these factors did, however, not make the relationship between disclosure/exposure and later alcohol use non-significant, which suggest that the association between disclosure/exposure to alcohol on social media and later alcohol use may be partly, but not fully, explained by third variables. One can, however, not ignore the option that other third variables, not included in the present study, may explain both increased disclosure/exposure and heightened alcohol consumption.

The hypothesis that high alcohol use may cause an increase in the level of disclosure and exposure of alcohol on social media was supported by the current results. Controlling for baseline alcohol use considerably weakened the association

between all the included types of disclosure and exposure and later alcohol use, and eliminated the association between disclosure/exposure of content reflecting negative aspects of alcohol and later alcohol use. This finding suggests that disclosure/exposure primarily mirrors, rather than influence, alcohol use, and that this is particularly true for content referring to negative aspects of alcohol (e.g. hangovers, loss of control, hangover anxiety). The association between exposure to alcohol-related content referring to positive aspects of alcohol and later alcohol use evaporated when both potential third variables and baseline alcohol use was controlled for. The finding that sharing alcohol content on social media and offline alcohol use may be related due to alcohol posts reflecting offline use is a novel finding, but it supports previous theoretical assumptions (Geusens & Beullens, 2016b; Westgate & Holliday, 2016; Westgate et al., 2014). Exposure to alcohol on social media is often assumed to influence later alcohol use, and two longitudinal studies support this assumption (Boyle et al., 2016; Huang, Unger, et al., 2014). The current results, however, indicate that exposures do not influence later alcohol use, but that exposure rather reflects alcohol use and thirds variables (predicting both disclosure and exposure). Another possibility is that disclosure/exposure have causal effects on alcohol use, but that these effects are too small, short-lived, or intertwined with other factors (e.g. alcohol-related cognitions), to be detected with the current study's design. In addition, it should be noted that the participants' alcohol use at T1 had a strong association with their alcohol use at T2, which could suggest that the participants' alcohol habits were largely pre-established and perhaps hard to influence. Disclosure and exposure to alcohol on social media may hence exert a greater influence on alcohol use in life-stages were alcohol habits are established. Further, alcohol disclosure/exposure on social media was strongly and positively related to alcohol use**.** Alcohol use and alcohol disclosure/exposure may thus be heavily intertwined and mutually reinforcing, which could make directionality and causality hard to determine with the current design.

One effect did, however, prevail even when baseline alcohol use and the wide range of potential third variables were controlled for, namely the association between disclosure of content referring to positive aspects of alcohol use (e.g. happiness,

social cohesion, or relaxation) and later alcohol use. Sharing such content may be determined by variables not included in the present study (e.g. more positive alcohol experiences). The current results indicate nevertheless that sharing alcohol content depicting positive aspects of alcohol may cause a small increase in later alcohol use. Several social theories may explain how disclosing alcohol-related content may results in an increase in later use, among them cognitive dissonance theory, self-perception theory, the theory regarding self-fulfilling prophecies, and the theory of operant conditioning. According to cognitive dissonance theory and self-perception theory observing own behaviour (e.g. sharing alcohol-related content with a positive valence of alcohol) can affect our attitudes towards this behaviour (e.g. alcohol use) and hence later actual behaviour (Bem, 1972; Festinger, 1962). These theories may explain how disclosure of content with a positive valence of alcohol may determine further alcohol use, while disclosure of content with a negative valence may not. It is reasonable to assume that individuals who shares content highlighting positive aspects of alcohol is more likely to deduce positive attitudes towards alcohol, compared to individuals who shares content addressing negative aspects of alcohol. Theories regarding self-fulfilling prophecies suggest that others' expectations of us can shape our behaviour (R. Rosenthal, 1985). Posting a lot of alcohol-related content may make others expect that the poster is more willing to drink, and the poster may therefore be invited to more settings were alcohol is consumed. Sharing alcohol content with a positive valence may make the sharer a particularly sought-after drinking buddy, as the positive valence could suggest that drinking with this individual would be a particularly enjoyable endeavour. Finally, sharing content depicting positive aspects of alcohol could lead to increased alcohol use through positive reinforcements (e.g. likes on party-pictures) enhancing further behaviour (e.g. drinking) (Skinner, 1953), a claim which is supported by previous studies reporting that alcohol posts on social media gain likes etc., which is particularly true for content reflecting positive aspects of alcohol, and that such likes etc. are indeed experienced as pleasurable (Beullens & Schepers, 2013; Sherman et al., 2017).

In summary, the thesis' results indicates that the relationship between alcohol use and disclosure/exposure of alcohol on social media could be explained by a range of third variables predicting disclosure/exposure and alcohol use, as well as high alcohol use leading to more alcohol disclosure/exposure. Disclosure of content depicting positive aspects of alcohol may, however, have a bidirectional relationship with alcohol use, where increased disclosure of such content influence further alcohol use and vice versa. The causal and directional relationship between alcohol disclosure/exposure and alcohol use, as indicated by the thesis' results, are demonstrated in figure 3. It is, however, important to note that these are just inductive hypotheses made from the current results, and far from proven relationships.
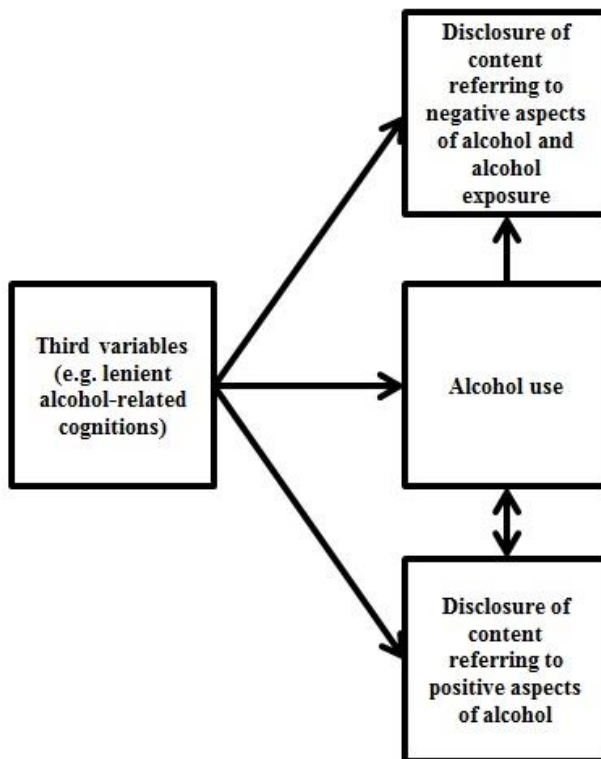
Figure 3 Suggested causal relationship between alcohol use and disclosure/exposure of alcohol on social media

5.3 Methodological discussion

5.3.1 Generalizability

To which degree the thesis's results may apply to the population (Norwegian students in Bergen) of which the sample was gathered from and to other populations (e.g. other student populations) could be discussed. The response rate in the first wave (i.e. 39.4%) may be considered as somewhat low, although it is an acceptable/good response rate when compared to similar studies (Nedregård & Olsen, 2014; Sheehan, 2001). It should further be noted that some of the analyses had a considerable number of missing data. No missing data analyses were conducted, which should be considered as a limitation. Some missing data is, however, to be expected considering the large amount of variables included. The available data on Norwegian students is sparse. Around 60% of Norwegian students are women which is comparable to the sex distribution in the current samples (Statistisk sentralbyrå, 2017). Further, the sample's characteristics (e.g. in terms of alcohol use, sex, age, and relationship status) are similar to the characteristics found among a national sample of students in higher education (Nedregård & Olsen, 2014). The drop-out analysis suggested that the two samples which were used in the thesis had comparable characteristics. Hence, the results from this thesis are likely to be generalizable to the Norwegian student population. Whether the results are generalizable to other student populations or not is harder to determine. Previous studies have suggested that different student populations vary as in how often they post alcohol content as well as in drinking habits (Beenstock et al., 2011; Beullens & Schepers, 2013; Heather et al., 2011; Karl et al., 2010; Nedregård & Olsen, 2014; Pengpid et al., 2013). Student populations worldwide have, however, been suggested to be quite a homogeneous group and the similarities between different student populations may be increasing due to internationalisation processes (Gargano, 2009). These homogenization effects may suggest that the current results might be relevant for student populations in other countries one as well.

5.3.2 Measurements

Several aspects of the measurements could be discussed, i.e. the inclusion of items with unknown psychometric properties and one-item measurements, the self-report design, and the time lapse between the first and second wave of the survey. Several of the included measurements were based on instruments with decent psychometrical properties. Due to the limited amount of previous research, the items regarding disclosure and exposure of alcohol on social media were developed for the sake of the current study. These items could have benefited from some additional editing (e.g. including several response alternatives between "never" and "less than monthly"). The validity and reliability of the items measuring disclosure/exposure were not tested, which suggest that interpretation of the results should be done with caution. Another limitation with the current measures is that some concepts were measured by single-items (e.g. prototypic evaluations, specific type of alcohol disclosure/exposure), which could make the results more likely to be affected by measurements errors (Nunnally, 1978). The measures are also exclusively based on self-report, a mode of inquiry that involves some advantages (e.g. providing access to the participants own interpretations of alcohol content), but which also may be affected by certain response biases (Gnambs & Kaspar, 2015; Raphael, 1987). One such response bias is the social desirability bias where participants underreport socially condemned behaviour and over-report socially accepted behaviour (Fisher, 1993). This bias is believed to influence responses regarding alcohol, among others (Davis, Thake, & Vilhena, 2010). The current results may, however, be less affected by such biased responding as responses to web-based surveys (like the current ones) are likely to be less affected by social desirability bias (Gnambs & Kaspar, 2015; Tourangeau & Yan, 2007). Another response bias which may affect the results of surveys is demand characteristics, where the participants adjust their response in accordance (or discordance) with the study's perceived purpose (Orne, 1962). The participants in the current project knew that the main topics were use of alcohol and social media among students. The participants' answers regarding alcohol use and social media could hence have been influenced by their beliefs regarding the researchers potential hypotheses of alcohol and social media use in the student

population. Another issue relates to the sole reliance on self-report and is denoted as the common methods bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Results are affected by the common methods bias when response variance can be explained by measurement features (e.g. wording which indicates research hypothesis) rather than variance in the construct (Podsakoff et al., 2003). Podsakoff et al. (2003) emphasise how using the same informational source (e.g. self-report) in a study could increase the likelihood of results being affected by common methods bias, as a common mode of inquiry will be affected by the same measurement errors (e.g. social desirability bias with self-report or negative affectivity)**.** Several measures were taken to minimize the effect of potential response biases (i.e. we aimed to use of neutral, non-moralizing, and clear/concise language in the questionnaires, use of different scale formats and reverse-coded items, and ensuring participants that only three specific and named researchers would have access to their answers). In addition, items were separated on different pages of the survey, and the first and the follow-up survey was separated by one year. Separating items spatially or temporally can reduce the influence of common methods bias due to the use of a common mode of inquiry (Podsakoff et al., 2003). In summary, the current results are unlikely to be caused by response biases. Another aspect regarding the measurements used is the time lapse of one year between the first survey and the follow-up. The advantage with such a long time lapse is that the associations found can be considered as robust, while the drawback is that more short-lived effects will not be identified. Finally, it should be mentioned that some concepts which could have been interesting to include in the thesis was not measured (e.g. alcohol identity and time spent on social media).

5.3.3 Ethical considerations

Although the study was approved by the Regional Committee for Medical and Health Research Ethics, Western Norway (no. 2015/1154) and adhered to the principles expressed in the Declaration of Helsinki, some ethical aspects of the study could still be worth discussing. The most apparent one being the burdens versus the benefits related to participation. The survey was quite comprehensive and included questions that may have triggered emotional distress for some participants (e.g.

questions regarding mental health, and alcohol and drug use). Participants were encouraged to contact the researchers (all clinical psychologist) if they experienced any emotional distress related to their participation. However, none of the participants did, which suggests that participation did not involve considerable emotional distress. Some participants did, however, report they found the survey too time demanding. The time invested in participation was sought compensated by giving automatic feedback related to personality and alcohol use, and by giving prizes (i.e. gift-cards and iPhones) to randomly chosen participants. The fact that only some of the participants received gift-cards or iPhones could be reckoned as unequal treatment of participants. Each participant had, however, the same likelihood of receiving a price which could be argued to make the distribution of prizes fair. To compensate the participants, the researchers have also presented the results from the study in different settings where the population and sample could be reached (e.g. student newspaper, introductory student lectures) in order to share the acquired knowledge with the participants. The potential gains of the current research for the population (i.e. Norwegian students) and other populations could be argued to be indisputable, given the extent of alcohol and social media use, as well as the potential risk associated with alcohol use.

5.3.4 Strengths

The methods in this thesis have some considerable strengths. The most important ones may be the large sample size and the wide range of variables included in the different analyses, these features is unparalleled by previous research on user-generated alcohol content on social media. Another important strength is the longitudinal design, which permits inferences regarding directionality/causality, although it should be admitted that the current design does not secure full control over endogenous factors. Finally, the fact that disclosure and exposure were measured across different social media sites should be reckoned as a strength with the research conducted in this thesis.

5.4 Conclusion

Norwegian students share alcohol-related content on their social media quite infrequently, while exposure to such content is far more common. Both the senders and the viewers of alcohol content on social media mainly interpret it as a reflection of positive aspects of alcohol or the setting where alcohol was enjoyed. Disclosure and exposure is determined by several factors. Disclosure of alcohol-related content may be particularly predicted by self-presentation motivations (e.g. presenting oneself as social and popular), while exposure appeared to be more determined by an increased interest in others. High alcohol use and more lenient alcohol-related cognitions may increase the level of disclosure and exposure to alcohol on social media. Excessive social media use may positively predict exposure to alcohol on social media, while in some instances be negatively associated with disclosure of similar content. Frequent disclosure and frequent exposure of alcohol-related content on social media indicate high alcohol use, a finding which is particularly true for frequent disclosure. The causal relationship between disclosure/exposure and alcohol use, seems primarily to be explained by high alcohol use predicting more alcohol disclosure and exposure. The current results suggest that disclosure of content with a positive valence of alcohol may have a small causal influence on future alcohol use. More research (e.g. experimental studies) is, however, imperative before final conclusions regarding the causal relationship between alcohol disclosure/exposure on social media and alcohol use can be drawn. The thesis contributes with new knowledge regarding determinants of disclosure and exposure of alcohol on social media, and adds to the understanding of how alcohol-related content may relate to alcohol use in a long-term perspective.

5.5 Implications

The strong association between disclosure of alcohol-related content on social media and alcohol use reported in this thesis implies that social media could be an apt arena for detecting and preventing risky drinking. The results give an indication of which risky drinkers that may disclose alcohol on social media and not. This

knowledge could give an indication of how social media prevention campaigns could be customized to fit its targets. The current results do not support the notion of alcohol exposure on social media as a determinant of further alcohol use, but this notion is still not disproved. If exposure is to be viewed as a determinant of alcohol use, the current results could contribute with knowledge regarding which individuals that may be particularly vulnerable for this influence and may be in need of counter alcohol messages. The thesis may also give indications of factors which may govern social media behaviour in general, and how social media may influence offline behaviour in a wider sense. Several questions regarding user-generated content remains, and could be interesting inquires for future research. More studies using an experimental and/or prospective design with shorter follow-up time are needed to better understand the relationship between alcohol disclosure/exposure on social media and alcohol use. An important aim for future research should be the investigation of how alcohol prevention campaigns on social media should be designed and conducted to achieve optimal results.

6. REFERENCES

Abrams, D. B., & Wilson, G. T. (1979). Effects of alcohol on social anxiety in women: Cognitive versus physiological processes. *Journal of Abnormal Psychology, 88*(2), 161-173. doi:http://dx.doi.org/10.1037/0021-843X.88.2.161

Aizenman, J., & Brooks, E. (2008). Globalization and taste convergence: the cases of wine and beer. *Review of International Economics, 16*(2), 217-233. doi:http://dx.doi.org/10.1111/j.1467-9396.2007.00659.x

American Psychiatric Association. (2013). Substance-related and addictive disorders *Diagnostic and statistical manual of mental disorders* (5th ed.): doi: http://dx.doi.org/10.1176/appi.books.9780890425596.dsm16

Anderson, P., De Bruijn, A., Angus, K., Gordon, R., & Hastings, G. (2009). Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol and Alcoholism, 44*(3), 229-243. doi:https://doi.org/10.1093/alcalc/agn115

Andersson, C., Johnsson, K. O., Berglund, M., & Ojehagen, A. (2007). Alcohol involvement in Swedish university freshmen related to gender, age, serious relationship and family history of alcohol problems. *Alcohol and Alcoholism, 42*(5), 448-455. doi:http://dx.doi.org/10.1093/alcalc/agm008

Andreassen, C. S., Billieux, J., Griffiths, M. D., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors, 30*(2), 252-262. doi:http://dx.doi.org/10.1037/adb0000160

Aral, S., & Walker, D. (2012). Identifying influential and susceptible members of social networks. *Science, 337*(6092), 337-341. doi:http://dx.doi.org/10.1126/science.1215842

Asch, S. E. (1956). Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs: General and Applied, 70*(9), 1-70. doi:http://dx.doi.org/10.1037/h0093718

Ashton, M. C., Lee, K., & Paunonen, S. V. (2002). What is the central feature of extraversion? Social attention versus reward sensitivity. *Journal of Personality and Social Psychology, 83*(1), 245-252. doi:http://dx.doi.org/10.1037/0022-3514.83.1.245

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test: Guidelines for use in primary care*. www.who.int: World Health Organization.

Bandura, A. (1965). Vicarious processes: A case of no-trial learning. *Advances in Experimental Social Psychology, 2*, 1-55. doi:https://doi.org/10.1016/S0065-2601(08)60102-1

Bargh, J. A., & McKenna, K. Y. (2004). The Internet and social life. *Annual Review of Psychology, 55*, 573-590. doi:https://doi.org/10.1146/annurev.psych.55.090902.141922

Barker, V. (2009). Older adolescents' motivations for social network site use: The influence of gender, group identity, and collective self-esteem. *Cyberpsychology & Behavior, 12*(2), 209-213. doi:https://doi.org/10.1089/cpb.2008.0228

Beccaria, F., & Sande, A. (2003). Drinking games and rite of life projects: A social comparison of the meaning and functions of young people's use of alcohol during the

rite of passage to adulthood in Italy and Norway. *Young, 11*(2), 99-119. doi:https://doi.org/10.1177/1103308803011002001

Beenstock, J., Adams, J., & White, M. (2011). The association between time perspective and alcohol consumption in university students: Cross-sectional study. *European Journal of Public Health, 21*(4), 438-443. doi:http://dx.doi.org/10.1093/eurpub/ckp225

Bem, D. J. (1972). Self-Perception Theory. *Advances in Experimental Social Psychology, 6*, 1-62. doi:https://doi.org/10.1016/S0065-2601(08)60024-6

Bernardi, R. A. (1994). Validating research results when Cronbach's alpha is below. 70: A methodological procedure. *Educational and Psychological Measurement, 54*(3), 766-775. doi:https://doi.org/10.1177/0013164494054003023

Beullens, K., & Schepers, A. (2013). Display of alcohol use on Facebook: A content analysis. *Cyberpsychology, Behavior, and Social Networking, 16*(7), 497-503. doi:https://doi.org/10.1089/cyber.2013.0044

Bewick, V., Cheek, L., & Ball, J. (2005). Statistics review 14: Logistic regression. *Critical Care, 9*(1), 112-118. doi:https://doi.org/10.1186/cc3045

Bingham, C. R., Shope, J. T., & Tang, X. L. (2005). Drinking behavior from high school to young adulthood: Differences by college education. *Alcoholism-Clinical and Experimental Research, 29*(12), 2170-2180. doi:http://dx.doi.org/10.1097/013.alc.0000191763.56873.c4

Bland, J. M., & Altman, D. G. (1994). Statistics notes: Some examples of regression towards the mean. *The BMJ, 309*(6957), 780. doi:https://doi.org/10.1136/bmj.309.6957.780

Bohn, M. J., Babor, T. F., & Kranzler, H. R. (1995). The Alcohol Use Disorders Identification Test (AUDIT): validation of a screening instrument for use in medical settings. *Journal of Studies on Alcohol, 56*(4), 423-432. doi:http://dx.doi.org/10.15288/jsa.1995.56.423

Borsari, B., Murphy, J. G., & Barnett, N. P. (2007). Predictors of alcohol use during the first year of college: Implications for prevention. *Addictive Behaviors, 32*(10), 2062-2086. doi:http://dx.doi.org/10.1016/j.addbeh.2007.01.017

Boyle, S. C., LaBrie, J. W., Froidevaux, N. M., & Witkovic, Y. D. (2016). Different digital paths to the keg? How exposure to peers' alcohol-related social media content influences drinking among male and female first-year college students. *Addictive Behaviors, 57*, 21-29. doi:http://dx.doi.org/10.1016/j.addbeh.2016.01.011

Breaugh, J. A. (2003). Effect size estimation: Factors to consider and mistakes to avoid. *Journal of Management, 29*(1), 79-97. doi:https://doi.org/10.1177/014920630302900106

Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.

Bryden, A., Roberts, B., McKee, M., & Petticrew, M. (2012). A systematic review of the influence on alcohol use of community level availability and marketing of alcohol. *Health & Place, 18*(2), 349-357. doi:https://doi.org/10.1016/j.healthplace.2011.11.003

Canary, D. J., Stafford, L., Hause, K. S., & Wallace, L. A. (1993). An inductive analysis of relational maintenance strategies: Comparisons among lovers, relatives, friends, and others. *Communication Research Reports, 10*(1), 3-14. doi:http://dx.doi.org/10.1080/08824099309359913

Carey, K. B. (1995). Alcohol-related expectancies predict quantity and frequency of heavy drinking among college students. *Psychology of Addictive Behaviors, 9*(4), 236-241. doi:http://dx.doi.org/10.1037/0893-164X.9.4.236

Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics—*

Simulation and Computation, 39(4), 860-864.
doi:http://dx.doi.org/10.1080/03610911003650383

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*(4), 284-290. doi:http://dx.doi.org/10.1037/1040-3590.6.4.284

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2 ed.). NJ: Erlbaum: Hillsdale.

Connor, J., Gray, A., & Kypri, K. (2010). Drinking history, current drinking and problematic sexual experiences among university students. *Australian and New Zealand Journal of Public Health, 34*(5), 487-494. doi:http://dx.doi.org/10.1111/j.1753-6405.2010.00595.x

Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment, 6*(2), 117-128. doi:http://dx.doi.org/10.1037/1040-3590.6.2.117

Cooper, M. L. (2006). Does drinking promote risky sexual behavior? A complex answer to a simple question. *Current Directions in Psychological Science, 15*(1), 19-23. doi:https://doi.org/10.1111/j.0963-7214.2006.00385.x

Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R., & Mudar, P. (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. *Journal of Abnormal Psychology, 101*(1), 139-152. doi:http://dx.doi.org/10.1037/0021-843X.101.1.139

Corrao, G., Bagnardi, V., Zambon, A., & La Vecchia, C. (2004). A meta-analysis of alcohol consumption and the risk of 15 diseases. *Preventive Medicine, 38*(5), 613-619. doi:http://dx.doi.org/10.1016/j.ypmed.2003.11.027

Correa, T., Hinsley, A. W., & De Zuniga, H. G. (2010). Who interacts on the Web? The intersection of users' personality and social media use. *Computers in Human Behavior, 26*(2), 247-253. doi:https://doi.org/10.1016/j.chb.2009.09.003

Courtney, K. E., & Polich, J. (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychological Bulletin, 135*(1), 142-156. doi:https://doi.org/10.1037/a0014414

Cowan, J. D. (1983). Testing the escape hypotheses: Alcohol helps users to forget their feelings. *Journal of Nervous and Mental Disease, 171*(1), 40-48. doi:http://dx.doi.org/10.1097/00005053-198301000-00008

Curtin, J. J., & Fairchild, B. A. (2003). Alcohol and cognitive control: implications for regulation of behavior during response conflict. *Journal of Abnormal Psychology, 112*(3), 424-436. doi:http://dx.doi.org/10.1037/0021-843X.112.3.424

D'Angelo, J., Kerr, B., & Moreno, M. A. (2014). Facebook displays as predictors of binge drinking: From the virtual to the visceral. *Bulletin of Science, Technology & Society, 34*(5-6), 159-169. doi:http://dx.doi.org/10.1177/0270467615584044

D'Angelo, J., Zhang, C., Eickhoff, J., & Moreno, M. A. (2014). Facebook influence among incoming college freshmen: Sticky cues and alcohol. *Bulletin of Science, Technology & Society, 34*(1-2), 13-20. doi:https://doi.org/10.1177/0270467614538002

Davenport, S. W., Bergman, S. M., Bergman, J. Z., & Fearrington, M. E. (2014). Twitter versus Facebook: Exploring the role of narcissism in the motives and usage of different social media platforms. *Computers in Human Behavior, 32*, 212-220. doi:https://doi.org/10.1016/j.chb.2013.12.011

Davis, C. G., Thake, J., & Vilhena, N. (2010). Social desirability biases in self-reported alcohol consumption and harms. *Addictive Behaviors, 35*(4), 302-311. doi:https://doi.org/10.1016/j.addbeh.2009.11.001

DeVellis, R. F. (2012). *Scale development: Theory and applications. Third edition*. Thousand Oaks, CA: Sage.

Dhir, A., Pallesen, S., Torsheim, T., & Andreassen, C. S. (2016). Do age and gender differences exist in selfie-related behaviors? *Computers in Human Behavior, 63*, 549-555. doi:http://dx.doi.org/10.1016/j.chb.2016.05.053

Dietler, M. (2006). Alcohol: Anthropological/archaeological perspectives. *Annual Review of Anthropology, 35*, 229-249. doi:https://doi.org/10.1146/annurev.anthro.35.081705.123120

Dixit, A. R., & Crum, R. M. (2000). Prospective study of depression and the risk of heavy alcohol use in women. *American Journal of Psychiatry, 157*(5), 751-758. doi:http://dx.doi.org/10.1176/appi.ajp.157.5.751

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The Mini-IPIP scales: Tiny-yet-effective measures of the big five factors of personality. *Psychological Assessment, 18*(2), 192-203. doi:http://dx.doi.org/10.1037/1040-3590.18.2.192

Durlak, J. A. (2009). How to select, calculate, and interpret effect sizes. *Journal of Pediatric Psychology, 34*(9), 917-928. doi:https://doi.org/10.1093/jpepsy/jsp004

Edosomwan, S., Prakasan, S. K., Kouame, D., Watson, J., & Seymour, T. (2011). The history of social media and its impact on business. *Journal of Applied Management and Entrepreneurship, 16*(3), 79-91.

Egan, K. G., & Moreno, M. A. (2011). Alcohol references on undergraduate males' Facebook profiles. *American Journal of Men's Health, 5*(5), 413-420. doi:http://dx.doi.org/10.1177/1557988310394341

Erevik, E. K., Pallesen, S., Vedaa, Ø., Andreassen, C. S., & Torsheim, T. (2017). Alcohol use among Norwegian students: Demographics, personality and psychological health correlates of drinking patterns. *Nordic Studies on Alcohol and Drugs*. doi:http://dx.doi.org/10.1177/1455072517709918

Feiler, D. C., & Kleinbaum, A. M. (2015). Popularity, similarity, and the network extraversion bias. *Psychological Science, 26*(5), 593-603. doi:https://doi.org/10.1177/0956797615569580

Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2): Stanford university press.

Field, M., Mogg, K., Zetteler, J., & Bradley, B. P. (2004). Attentional biases for alcohol cues in heavy and light social drinkers: the roles of initial orienting and maintained attention. *Psychopharmacology, 176*(1), 88-93. doi:http://dx.doi.org/10.1007/s00213-004-1855-1

Figueredo, A. J., Sefcek, J. A., & Jones, D. N. (2006). The ideal romantic partner personality. *Personality and Individual Differences, 41*(3), 431-441. doi:https://doi.org/10.1016/j.paid.2006.02.004

Fisher, R. J. (1993). Social desirability bias and the validity of indirect questioning. *Journal of Consumer Research, 20*(2), 303-315. doi:https://doi.org/10.1086/209351

Fournier, A. K., Hall, E., Ricke, P., & Storey, B. (2013). Alcohol and the social network: Online social networking sites and college students' perceived drinking norms. *Psychology of Popular Media Culture, 2*(2), 86-95. doi:http://dx.doi.org/10.1037/a0032097

Fraley, R. C., & Davis, K. E. (1997). Attachment formation and transfer in young adults' close friendships and romantic relationships. *Personal Relationships, 4*(2), 131-144. doi:http://dx.doi.org/10.1111/j.1475-6811.1997.tb00135.x

Fromme, K., Stroot, E. A., & Kaplan, D. (1993). Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. *Psychological Assessment, 5*(1), 19-26. doi:http://dx.doi.org/10.1037/1040-3590.5.1.19

Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: An experimental study. *Developmental Psychology, 41*(4), 625-635. doi:http://dx.doi.org/10.1037/0012-1649.41.4.625

Gargano, T. (2009). (Re) conceptualizing international student mobility: The potential of transnational social fields. *Journal of Studies in International Education, 13*(3), 331-346. doi:https://doi.org/10.1177/1028315308322060

Gerrard, M., Gibbons, F. X., Houlihan, A. E., Stock, M. L., & Pomery, E. A. (2008). A dual-process approach to health risk decision making: The prototype willingness model. *Developmental Review, 28*(1), 29-61. doi:http://dx.doi.org/10.1016/j.dr.2007.10.001

Geusens, F., & Beullens, K. (2016a). The association between social networking sites and alcohol abuse among Belgian adolescents. *Journal of Media Psychology*. doi:http://dx.doi.org/10.1027/1864-1105/a000196

Geusens, F., & Beullens, K. (2016b). Strategic Self-Presentation or Authentic Communication? Predicting Adolescents' Alcohol References on Social Media. *Journal of Studies on Alcohol and Drugs, 78*(1), 124-133. doi:http://dx.doi.org/10.15288/jsad.2017.78.124

Gibbons, F. X., & Gerrard, M. (1995). Predicting young adults' health risk behavior. *Journal of Personality and Social Psychology, 69*(3), 505-517. doi:http://dx.doi.org/10.1037/0022-3514.69.3.505

Glassman, T. (2012). Implications for College Students Posting Pictures of Themselves Drinking Alcohol on Facebook. *Journal of Alcohol and Drug Education, 56*(1), 38-58.

Gnambs, T., & Kaspar, K. (2015). Disclosure of sensitive behaviors across self-administered survey modes: a meta-analysis. *Behavior Research Methods, 47*(4), 1237-1259. doi:http://dx.doi.org/10.3758/s13428-014-0533-4

Grant, B. F., Stinson, F. S., Dawson, D. A., Chou, S. P., Dufour, M. C., Compton, W., . . . Kaplan, K. (2004). Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders - Results from the national epidemiologic survey on alcohol and related conditions. *Archives of General Psychiatry, 61*(8), 807-816. doi:http://dx.doi.org/10.1001/archpsyc.61.8.807

Graziano, W. G., & Eisenberg, N. (1997). Agreeableness: A dimension of personality. In R. Hogan, J. A. Johnson & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 795-824).

Groth, G. G., Longo, L. M., & Martin, J. L. (2017). Social media and college student risk behaviors: A mini-review. *Addictive Behaviors, 65*, 87-91. doi:https://doi.org/10.1016/j.addbeh.2016.10.003

Gupta, H., Pettigrew, S., Lam, T., & Tait, R. J. (2016). A systematic review of the impact of exposure to internet-based alcohol-related content on young people's alcohol use behaviours. *Alcohol and Alcoholism, 51*(6), 763-771. doi:https://doi.org/10.1093/alcalc/agw050

Harada, S., Agarwal, D., & Goedde, H. (1995). Aldehyde dehydrogenase deficiency as cause of facial flushing reaction to alcohol in Japanese. *The Lancet, 318*(8253), 982. doi:http://dx.doi.org/10.1016/S0140-6736(81)91172-7

Heath, D. B. (1987). Anthropology and alcohol studies: Current issues. *Annual Review of Anthropology, 16*(1), 99-120. doi:http://dx.doi.org/10.1146/annurev.an.16.100187.000531

Heather, N., Partington, S., Partington, E., Longstaff, F., Allsop, S., Jankowski, M., . . . Gibson, A. S. C. (2011). Alcohol use disorders and hazardous drinking among

undergraduates at English universities. *Alcohol and Alcoholism, 46*(3), 270-277. doi:http://dx.doi.org/10.1093/alcalc/agr024

Hebden, R., Lyons, A. C., Goodwin, I., & McCreanor, T. (2015). "When You Add Alcohol, It Gets That Much Better" University Students, Alcohol Consumption, and Online Drinking Cultures. *Journal of Drug Issues, 45*(2), 214-226. doi:https://doi.org/10.1177/0022042615575375

Hendriks, H., Gebhardt, W. A., & van den Putte, B. (2017). Alcohol-related posts from young people on social networking sites: Content and motivations. *Cyberpsychology, Behavior, and Social Networking, 20*(7), 428-435. doi:https://doi.org/10.1089/cyber.2016.0640

Higuchi, S., Matsushita, S., Murayama, M., Takagi, S., & Hayashida, M. (1995). Alcohol and aldehyde dehydrogenase polymorphisms and the risk for alcoholism. *The American journal of psychiatry, 152*(8), 1219-1221. doi:https://doi.org/10.1176/ajp.152.8.1219

Hingson, R. W., Heeren, T., Zakocs, R. C., Kopstein, A., & Wechsler, H. (2002). Magnitude of alcohol-related mortality and morbidity among US college students ages 18-24. *Journal of Studies on Alcohol, 63*(2), 136-144. doi:http://dx.doi.org/10.15288/jsa.2002.63.136

Holmila, M., & Raitasalo, K. (2005). Gender differences in drinking: why do they still exist? *Addiction, 100*(12), 1763-1769. doi:http://dx.doi.org/10.1111/j.1360-0443.2005.01249.x

Huang, G. C., Soto, D., Fujimoto, K., & Valente, T. W. (2014). The Interplay of Friendship Networks and Social Networking Sites: Longitudinal Analysis of Selection and Influence Effects on Adolescent Smoking and Alcohol Use. *American Journal of Public Health, 104*(8), e51-e59. doi:http://dx.doi.org/10.2105/AJPH.2014.302038

Huang, G. C., Unger, J. B., Soto, D., Fujimoto, K., Pentz, M. A., Jordan-Marsh, M., & Valente, T. W. (2014). Peer influences: The impact of online and offline friendship networks on adolescent smoking and alcohol Use. *Journal of Adolescent Health, 54*(5), 508-514. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1016/j.jadohealth.2013.07.001

Hughes, D. J., Rowe, M., Batey, M., & Lee, A. (2012). A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Computers in Human Behavior, 28*(2), 561-569. doi:https://doi.org/10.1016/j.chb.2011.11.001

Hull, J. G., & Bond, C. F. (1986). Social and behavioral consequences of alcohol consumption and expectancy: a meta-analysis. *Psychological Bulletin, 99*(3), 347-360. doi:http://dx.doi.org/10.1037/0033-2909.99.3.347

Jackson, K. M. (2008). Heavy episodic drinking: Determining the predictive utility of five or more drinks. *Psychology of Addictive Behaviors, 22*(1), 68-77. doi:http://dx.doi.org/10.1037/0893-164X.22.1.68

Karl, K., Peluchette, J., & Schlaegel, C. (2010). Who's posting Facebook faux pas? A cross-cultural examination of personality differences. *International Journal Of Selection And Assessment, 18*(2), 174-186. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1111/j.1468-2389.2010.00499.x

Khan, S., Murray, R. P., & Barnes, G. E. (2002). A structural equation model of the effect of poverty and unemployment on alcohol abuse. *Addictive Behaviors, 27*(3), 405-423. doi:https://doi.org/10.1016/S0306-4603(01)00181-2

Knight-McCord, J., Cleary, D., Grant, N., Herron, A., Lacey, T., Livingston, T., . . . Emanuel, R. (2016). What social media sites do college students use most? *Journal of Undergraduate Ethnic Minority Psychology, 2*, 21-26.

Koob, G. F. (2004). A role for GABA mechanisms in the motivational effects of alcohol. *Biochemical Pharmacology, 68*(8), 1515-1525. doi:https://doi.org/10.1016/j.bcp.2004.07.031

Kumar, S., Porcu, P., Werner, D. F., Matthews, D. B., Diaz-Granados, J. L., Helfand, R. S., & Morrow, A. L. (2009). The role of GABAA receptors in the acute and chronic effects of ethanol: A decade of progress. *Psychopharmacology, 205*(4), 529-564. doi:http://dx.doi.org/10.1007/s00213-009-1562-z

Leifman, H., Kuhlhorn, E., Allebeck, P., Andreasson, S., & Romelsjo, A. (1995). Abstinence in late adolescence: Antecedents to and covariates of a sober life-style and its consequences. *Social Science & Medicine, 41*(1), 113-121. doi:http://dx.doi.org/10.1016/0277-9536(94)00298-8

Lennox, R. D., & Wolfe, R. N. (1984). Revision of the self-monitoring scale. *Journal of Personality and Social Psychology, 46*(6), 1349-1364. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1037/0022-3514.46.6.1349

Lindman, R. E., Sjöholm, B. A., & Lang, A. R. (2000). Expectations of alcohol-induced positive affect: A cross-cultural comparison. *Journal of Studies on Alcohol, 61*(5), 681-687. doi:https://doi.org/10.15288/jsa.2000.61.681

Linsky, A. S., Colby Jr, J. P., & Straus, M. A. (1986). Drinking norms and alcohol-related problems in the United States. *Journal of Studies on Alcohol, 47*(5), 384-393. doi:https://doi.org/10.15288/jsa.1986.47.384

Litt, D. M., & Stock, M. L. (2011). Adolescent alcohol-related risk cognitions: The roles of social norms and social networking sites. *Psychology of Addictive Behaviors, 25*(4), 708-713. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1037/a0024226

Malouff, J. M., Thorsteinsson, E. B., Rooke, S. E., & Schutte, N. S. (2007). Alcohol involvement and the five-factor model of personality: A meta-analysis. *Journal of Drug Education, 37*(3), 277-294. doi:http://dx.doi.org/10.2190/DE.37.3.d

McCrae, R. R., & John, O. P. (1992). An introduction to the 5-factor model and its applications. *Journal of Personality, 60*(2), 175-215. doi:http://dx.doi.org/10.1111/j.1467-6494.1992.tb00970.x

Merenakk, L., Harro, M., Kiive, E., Laidra, K., Eensoo, D., Allik, J., . . . Harro, J. (2003). Association between substance use, personality traits, and platelet MAO activity in preadolescents and adolescents. *Addictive Behaviors, 28*(8), 1507-1514. doi:http://dx.doi.org/10.1016/s0306-4603(02)00270-8

Michalak, L., Trocki, K., & Bond, J. (2007). Religion and alcohol in the US National Alcohol Survey: How important is religion for abstention and drinking? *Drug and Alcohol Dependence, 87*(2-3), 268-280. doi:http://dx.doi.org/10.1016/j.drugalcdep.2006.07.013

Michikyan, M., Dennis, J., & Subrahmanyam, K. (2015). Can you guess who I am? Real, ideal, and false self-presentation on Facebook among emerging adults. *Emerging Adulthood, 3*(1), 55-64. doi:https://doi.org/10.1177/2167696814532442

Miller, J., Prichard, I., Hutchinson, A., & Wilson, C. (2014). The relationship between exposure to alcohol-related content on Facebook and predictors of alcohol consumption among female emerging adults. *Cyberpsychology Behavior and Social Networking, 17*(12), 735-741. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1089/cyber.2014.0337

Moreno, M. A., Arseniev-Koehler, A., Litt, D., & Christakis, D. (2016). Evaluating College Students' Displayed Alcohol References on Facebook and Twitter. *Journal of Adolescent Health, 58*(5), 527-532. doi:http://dx.doi.org/10.1016/j.jadohealth.2016.01.005

Moreno, M. A., Briner, L. R., Williams, A., Brockman, L., Walker, L., & Christakis, D. A. (2010). A content analysis of displayed alcohol references on a social networking web site. *Journal of Adolescent Health, 47*(2), 168-175. doi:http://dx.doi.org/10.1016/j.jadohealth.2010.01.001

Moreno, M. A., Christakis, D. A., Egan, K. G., Brockman, L. N., & Becker, T. (2012). Associations between displayed alcohol references on Facebook and problem drinking among college students. *Archives of Pediatrics & Adolescent Medicine, 166*(2), 157-163. doi:http://dx.doi.org/10.1001/archpediatrics.2011.180

Moreno, M. A., D'Angelo, J., Kacvinsky, L. E., Kerr, B., Zhang, C., & Eickhoff, J. (2014). Emergence and predictors of alcohol reference displays on Facebook during the first year of college. *Computers in Human Behavior, 30*, 87-94. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1016/j.chb.2013.07.060

Muscanell, N. L., & Guadagno, R. E. (2012). Make new friends or keep the old: Gender and personality differences in social networking use. *Computers in Human Behavior, 28*(1), 107-112. doi:https://doi.org/10.1016/j.chb.2011.08.016

Muthén, L. K., & Munthén, B. O. (1998-2001). *Mplus User's Guide. Sixth Edition*. Los Angeles, CA: Muthén & Muthén.

Myrtveit, S. M., Askeland, K. G., Knudsen, A. K., Knapstad, M., & Skogen, J. C. (2016). Risky drinking among Norwegian students: Associations with participation in the introductory week, academic performance and alcohol-related attitudes. *Nordic Studies on Alcohol and Drugs, 33*, 1458-6126. doi:http://dx.doi.org/10.1515/nsad-2016-0025

Nedregård, T., & Olsen, R. (2014). Studentenes helse- og trivselsundersøkelse 2014. [Students' Health and Wellbeing Survey 2014]. Retrieved from: http://www.google.no/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CB0QFjAA&url=http%3A%2F%2Fwww.vtbergen.no%2Fwp-content%2Fuploads%2F2013%2F10%2FVT0614_6214_SHoT2014.pdf&ei=w21HVZvGEIOvswG8woGQDw&usg=AFQjCNESqBK5IcWkVZUNzMxPA7ANwM2HzA&sig2=CahhInSPe7w4ZBNAUWdXiA

Nemes, S., Jonasson, J. M., Genell, A., & Steineck, G. (2009). Bias in odds ratios by logistic regression modelling and sample size. *BMC Medical Research Methodology, 9*(1), 56. doi:https://doi.org/10.1186/1471-2288-9-56

Niland, P., Lyons, A. C., Goodwin, I., & Hutton, F. (2014). 'See it doesn't look pretty does it?' Young adults' airbrushed drinking practices on Facebook. *Psychology & Health, 29*(8), 877-895. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1080/08870446.2014.893345

Nolen-Hoeksema, S. (2004). Gender differences in risk factors and consequences for alcohol use and problems. *Clinical Psychology Review, 24*(8), 981-1010. doi:http://dx.doi.org/10.1016/j.cpr.2004.08.003

Northcote, J. (2006). Nightclubbing and the search for identity: Making the transition from childhood to adulthood in an urban milieu. *Journal of Youth Studies, 9*(1), 1-16. doi:http://dx.doi.org/10.1080/13676260500523580

Nunnally, J. C. (1978). *Psychometric theory*.

O'Cass, A. (2000). A psychometric evaluation of a revised version of the Lennox and Wolfe revised self-monitoring scale. *Psychology and Marketing, 17*(5), 397-419. doi:http://dx.doi.org/10.1002/(SICI)1520-6793(200005)17:5<397::AID-MAR3>3.0.CO;2-D

O'Malley, P. M., & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol, Supplement*(14), 23-39. doi:http://dx.doi.org/10.15288/jsas.2002.s14.23

Orne, M. T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist, 17*(11), 776-783. doi:http://dx.doi.org/10.1037/h0043424

Osberg, T. M., Billingsley, K., Eggert, M., & Insana, M. (2012). From Animal House to Old School: A multiple mediation analysis of the association between college drinking movie exposure and freshman drinking and its consequences. *Addictive Behaviors, 37*(8), 922-930. doi:https://doi.org/10.1016/j.addbeh.2012.03.030

Pallant, J. (2013). *SPSS: Survival manual*. Berkshire, England: McGraw-Hill.

Pedersen, W. (2015). *Bittersøtt. [Bitter sweet]*. Oslo, Noway: Universitetsforlaget.

Pegg, K. J., O'Donnell, A. W., Lala, G., & Barber, B. L. (2017). The role of online social identity in the relationship between alcohol-related content on social networking sites and adolescent alcohol use. *Cyberpsychology, Behavior, and Social Networking*. doi:https://doi.org/10.1089/cyber.2016.0665

Peluchette, J., & Karl, K. (2008). Social networking profiles: An examination of student attitudes regarding use and appropriateness of content. *CyberPsychology & Behavior, 11*(1), 95-97. doi:http://dx.doi.org/10.1089/cpb.2007.9927

Peng, G. S., Wang, M. F., Chen, C. Y., Luu, S. U., Chou, H. C., Li, T. K., & Yin, S. J. (1999). Involvement of acetaldehyde for full protection against alcoholism by homozygosity of the variant allele of mitochondrial aldehyde dehydrogenase gene in Asians. *Pharmacogenetics and Genomics, 9*(4), 463-476.

Pengpid, S., Peltzer, K., van der Heever, H., & Skaal, L. (2013). Screening and brief interventions for hazardous and harmful alcohol use among university students in South Africa: Results from a randomized controlled trial. *International Journal of Environmental Research and Public Health, 10*(5), 2043-2057. doi:http://dx.doi.org/10.3390/ijerph10052043

Perkins, H. W. (2007). Misperceptions of peer drinking norms in Canada: Another look at the "reign of error" and its consequences among college students. *Addictive Behaviors, 32*(11), 2645-2656. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1016/j.addbeh.2007.07.007

Perrin, A. (2015). Social media usage: 2005-2015. Retrieved from http://www.pewinternet.org/2015/10/08/2015-Social-Networking-Usage-2005-2015/

Pittman, L. D., & Richmond, A. (2008). University belonging, friendship quality, and psychological adjustment during the transition to college. *The Journal of Experimental Education, 76*(4), 343-362. doi:http://dx.doi.org/10.3200/JEXE.76.4.343-362

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. doi:http://dx.doi.org/10.1037/0021-9010.88.5.879

Pohorecky, L. A. (1978). Biphasic action of ethanol. *Biobehavioral Reviews, 1*(4), 231-240. doi:https://doi.org/10.1016/0147-7552(77)90025-0

Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin, 112*(1), 160-164. doi:http://dx.doi.org/10.1037/0033-2909.112.1.160

Pumper, M. A., & Moreno, M. A. (2013). Identifying high-risk alcohol users in first-year college students: Attitude, intention, and Facebook. *Journal of Alcoholism and Drug Dependence, 1*(5). doi:http://dx.doi.org/10.4172/2329-6488.1000128

Raphael, K. (1987). Recall bias - A proposal for assesment and control. *International Journal of Epidemiology, 16*(2), 167-170. doi:http://dx.doi.org/10.1093/ije/16.2.167

Raynor, D. A., & Levine, H. (2009). Associations between the five-factor model of personality and health behaviors among college students. *Journal of American College Health, 58*(1), 73-81. doi:http://dx.doi.org/10.3200/JACH.58.1.73-82

Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., & Patra, J. (2009). Alcohol and Global Health 1: Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *The Lancet, 373*(9682), 2223-2233. doi:http://dx.doi.org/10.1016/S0140-6736(09)60746-7

Rehm, J., Room, R., Graham, K., Monteiro, M., Gmel, G., & Sempos, C. T. (2003). The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: An overview. *Addiction, 98*(9), 1209-1228. doi:http://dx.doi.org/10.1046/j.1360-0443.2003.00467.x

Reinert, D. F., & Allen, J. P. (2007). The alcohol use disorders identification test: An update of research findings. *Alcoholism: Clinical and Experimental Research, 31*(2), 185-199. doi:http://dx.doi.org/10.1111/j.1530-0277.2002.tb02534.x

Ridout, B., Campbell, A., & Ellis, L. (2012). 'Off your Face(book)': Alcohol in online social identity construction and its relation to problem drinking in university students. *Drug and Alcohol Review, 31*(1), 20-26. doi:http://dx.doi.org/10.1111/j.1465-3362.2010.00277.x

Rivis, A., Sheeran, P., & Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology, 11*, 483-500. doi:http://dx.doi.org/10.1348/135910705x70327

Rodriguez, L. M., Litt, D., Neighbors, C., & Lewis, M. A. (2016). I'm a Social (Network) Drinker: Alcohol-Related Facebook Posts, Drinking Identity, and Alcohol Use. *Journal of Social and Clinical Psychology, 35*(2), 107-129. doi:https://doi.org/10.1521/jscp.2016.35.2.107

Room, R. (1975). Normative perspectives on alcohol use and problems. *Journal of Drug Issues, 5*(4), 358-368. doi:https://doi.org/10.1177/002204267500500407

Rosenthal, J. A. (1996). Qualitative descriptors of strength of association and effect size. *Journal of Social Service Research, 21*(4), 37-59. doi:http://dx.doi.org/10.1300/J079v21n04_02

Rosenthal, R. (1985). From unconscious experimenter bias to teacher expectancy effects. In J. B. Dusek (Ed.), *Teacher Expectancies* (pp. 37-65): L. Erlbaum.

Sayette, M. A., Creswell, K. G., Dimoff, J. D., Fairbairn, C. E., Cohn, J. F., Heckman, B. W., . . . Moreland, R. L. (2012). Alcohol and group formation: A multimodal investigation of the effects of alcohol on emotion and social bonding. *Psychological Science, 23*(8), 869-878. doi:https://doi.org/10.1177/0956797611435134

Seidman, G. (2013). Self-presentation and belonging on Facebook: How personality influences social media use and motivations. *Personality and Individual Differences, 54*(3), 402-407. doi:https://doi.org/10.1016/j.paid.2012.10.009

Seitz, H. K., & Becker, P. (2007). Alcohol metabolism and cancer risk. *Alcohol Research and Health, 30*(1), 38-41.

Selfhout, M., Burk, W., Branje, S., Denissen, J., Van Aken, M., & Meeus, W. (2010). Emerging late adolescent friendship networks and Big Five personality traits: A social network approach. *Journal of Personality, 78*(2), 509-538. doi:http://dx.doi.org/10.1111/j.1467-6494.2010.00625.x

Sheehan, K. B. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication, 6*(2), 0-0. doi:http://dx.doi.org/10.1111/j.1083-6101.2001.tb00117.x

Sherman, L. E., Greenfield, P. M., Hernandez, L. M., & Dapretto, M. (2017). Peer Influence Via Instagram: Effects on Brain and Behavior in Adolescence and Young Adulthood. *Child Development*. doi:http://dx.doi.org/10.1111/cdev.12838

Singleton, R. A., & Wolfson, A. R. (2009). Alcohol consumption, sleep, and academic performance among college students. *Journal of Studies on Alcohol and Drugs, 70*(3), 355-363. doi:http://dx.doi.org/10.15288/jsad.2009.70.355

Skinner, B. F. (1953). *Science and human behavior*. New York: Simon and Schuster.

Slutske, W. S., Hunt-Carter, E. E., Nabors-Oberg, R. E., Sher, K. J., Bucholz, K. K., Madden, P. A. F., . . . Heath, A. C. (2004). Do college students drink more than their non-college-attending peers? Evidence from a population-based longitudinal female twin study. *Journal of Abnormal Psychology, 113*(4), 530-540. doi:http://dx.doi.org/10.1037/0021-843x.113.4.530

Snyder, M. (1974). Self-monitoring of expressive behavior. *Journal of Personality and Social Psychology, 30*(4), 526-537. doi:http://dx.doi.org/10.1037/h0037039

Sorocco, K. H., & Ferrell, S. W. (2006). Alcohol use among older adults. *The Journal of General Psychology, 133*(4), 453-467. doi:http://dx.doi.org/10.3200/GENP.133.4.453-467

Statistisk sentralbyrå. (2017). Studenter i høyere utdanning [Students in higher education]. Retrieved from https://www.ssb.no/utdanning/statistikker/utuvh

Statistisk sentralbyrå [Statistics Norway]. (2016). Bruk av sosiale medier, etter kjønn og alder [Use of social media, by gender and age] Retrieved from https://www.ssb.no/statistikkbanken/selecttable/hovedtabellHjem.asp?KortNavnWeb=ikthus&checked=true

Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist, 45*(8), 921-933. doi:http://dx.doi.org/10.1037/0003-066X.45.8.921

Steele, C. M., & Southwick, L. (1985). Alcohol and social behavior: I. The psychology of drunken excess. *Journal of Personality and Social Psychology, 48*(1), 18-34. doi:http://dx.doi.org/10.1037/0022-3514.48.1.18

Stoddard, S. A., Bauermeister, J. A., Gordon-Messer, D., Johns, M., & Zimmerman, M. A. (2012). Permissive norms and young adults' alcohol and marijuana use: The role of online communities. *Journal of Studies on Alcohol and Drugs, 73*(6), 968-975. doi:http://dx.doi.org/10.15288/jsad.2012.73.968

Subrahmanyam, K., Reich, S. M., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults. *Journal of Applied Developmental Psychology, 29*(6), 420-433. doi:https://doi.org/10.1016/j.appdev.2008.07.003

Sundhedsstyrelsen [Danish Health Authority]. (2017). Alkohol [Alcohol]. Retrieved from https://www.sst.dk/en/health-and-lifestyle/alcohol

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53-55. doi:https://doi.org/10.5116/ijme.4dfb.8dfd

Tavolacci, M. P., Boerg, E., Richard, L., Meyrignac, G., Dechelotte, P., & Ladner, J. (2016). Prevalence of binge drinking and associated behaviours among 3286 college students in France. *BMC Public Health, 16*(1), 178. doi:https://doi.org/10.1186/s12889-016-2863-x

Thombs, D. L., Olds, R. S., Bondy, S. J., Winchell, J., Baliunas, D., & Rehm, J. (2009). Undergraduate drinking and academic performance: A prospective investigation with objective measures. *Journal of Studies on Alcohol and Drugs, 70*(5), 776-785. doi:http://dx.doi.org/10.15288/jsad.2009.70.776

Thompson, C. M., & Romo, L. K. (2016). College students' drinking and posting about alcohol: Forwarding a model of motivations, behaviors, and consequences. *Journal of Health Communication, 21*(6), 688-695. doi:http://dx.doi.org/10.1080/10810730.2016.1153763

Tickle, J. J., Hull, J. G., Sargent, J. D., Dalton, M. A., & Heatherton, T. F. (2006). A structural equation model of social influences and exposure to media smoking on adolescent smoking. *Basic and Applied Social Psychology, 28*(2), 117-129. doi:http://dx.doi.org/10.1207/s15324834basp2802_2

Todd, J., & Mullan, B. (2011). Using the theory of planned behaviour and prototype willingness model to target binge drinking in female undergraduate university students. *Addictive Behaviors, 36*(10), 980-986. doi:http://dx.doi.org/10.1016/j.addbeh.2011.05.010

Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin, 133*(5), 859-883. doi:http://dx.doi.org/10.1037/0033-2909.133.5.859

Towns, A. J., Parker, C., & Chase, P. (2012). Constructions of masculinity in alcohol advertising: Implications for the prevention of domestic violence. *Addiction Research & Theory, 20*(5), 389-401. doi:http://dx.doi.org/10.3109/16066359.2011.648973

van Hoof, J. J., Bekkers, J., & van Vuuren, M. (2014). Son, you're smoking on Facebook! College students' disclosures on social networking sites as indicators of real-life risk behaviors. *Computers in Human Behavior, 34*, 249-257. doi:http://dx.doi.org/10.1016/j.chb.2014.02.008

Verster, J. C. (2008). The alcohol hangover–a puzzling phenomenon. *Alcohol and Alcoholism, 43*(2), 124-126. doi:http://dx.doi.org/10.1093/alcalc/agm163

Volkow, N. D., Wiers, C. E., Shokri-Kojori, E., Tomasi, D., Wang, G. J., & Baler, R. (2017). Neurochemical and metabolic effects of acute and chronic alcohol in the human brain: studies with positron emission tomography. *Neuropharmacology, 122*(1), 175-188. doi:https://doi.org/10.1016/j.neuropharm.2017.01.012

Vonghia, L., Leggio, L., Ferrulli, A., Bertini, M., Gasbarrini, G., Addolorato, G., & Group, A. T. S. (2008). Acute alcohol intoxication. *European Journal of Internal Medicine, 19*(8), 561-567. doi:http://dx.doi.org/10.1016/j.ejim.2007.06.033

Wason, P. C. (1968). Reasoning about a rule. *The Quarterly Journal of Experimental Psychology, 20*(3), 273-281. doi:http://dx.doi.org/10.1080/14640746808400161

Wechsler, H., Davenport, A., Dowdall, G., Moeykens, B., & Castillo, S. (1994). Health and behavioral consequences of binge-drinking in college: A national survey of students at 140 campuses. *Jama-Journal of the American Medical Association, 272*(21), 1672-1677. doi:http://dx.doi.org/10.1001/jama.272.21.1672

Wechsler, H., Dowdall, G. W., Davenport, A., & Castillo, S. (1995). Correlates of college-student binge drinking. *American Journal of Public Health, 85*(7), 921-926. doi:http://dx.doi.org/10.2105/ajph.85.7.921

Welsh, J. W., Knight, J. R., & Hadland, S. E. (2017). Adolescent Frequent Heavy Drinking From 1991–2015. *Pediatrics*, e20170932. doi:http://dx.doi.org/10.1542/peds.2017-0932

Westgate, E. C., & Holliday, J. (2016). Identity, influence, and intervention: The roles of social media in alcohol use. *Current Opinion in Psychology, 9*, 27-32. doi:http://dx.doi.org/10.1016/j.copsyc.2015.10.014

Westgate, E. C., Neighbors, C., Heppner, H., Jahn, S., & Lindgren, K. P. (2014). "I will take a shot for every 'like' I get on this status": Posting alcohol-related Facebook content is linked to drinking outcomes. *Journal of Studies on Alcohol and Drugs, 75*(3), 390-398. doi:http://dx.doi.org/10.15288/jsad.2014.75.390

Westmaas, J., Moeller, S., & Woicik, P. B. (2007). Validation of a measure of college students' intoxicated behaviors: Associations with alcohol outcome expectancies, drinking motives, and personality. *Journal of American College Health, 55*(4), 227-237. doi:http://dx.doi.org/10.3200/JACH.55.4.227-237

White, A., & Hingson, R. (2014). The burden of alcohol use: Excessive alcohol consumption and related consequences among college students. *Alcohol Research: Current Reviews, 35*(2), 201-218.

Whiting, A., & Williams, D. (2013). Why people use social media: A uses and gratifications approach. *Qualitative Market Research: An International Journal, 16*(4), 362-369. doi:https://doi.org/10.1108/QMR-06-2013-0041

Willis, P. E. (1977). *Learning to labor: How working class kids get working class jobs*: Columbia University Press.

Wilsnack, R. W., Vogeltanz, N. D., Wilsnack, S. C., & Harris, T. R. (2000). Gender differences in alcohol consumption and adverse drinking consequences: Cross-cultural patterns. *Addiction, 95*(2), 251-265. doi:http://dx.doi.org/10.1046/j.1360-0443.2000.95225112.x

Wilsnack, S. C., Vogeltanz, N. D., Klassen, A. D., & Harris, T. R. (1997). Childhood sexual abuse and women's substance abuse: National survey findings. *Journal of Studies on Alcohol, 58*(3), 264-271. doi:https://doi.org/10.15288/jsa.1997.58.264

Wilson, G. T., & Abrams, D. (1977). Effects of alcohol on social anxiety and physiological arousal: Cognitive versus pharmacological processes. *Cognitive Therapy and Research, 1*(3), 195-210. doi:http://dx.doi.org/10.1007/BF01186793

Winstock, A. R. (2014). The global drug survey 2014. findings. *Global Drug Survey*.

Wolffgramm, J., & Heyne, A. (1995). From controlled drug intake to loss of control: The irreversible development of drug addiction in the rat. *Behavioural Brain Research, 70*(1), 77-94. doi:https://doi.org/10.1016/0166-4328(95)00131-C

Wood, M. D., Nagoshi, C. T., & Dennis, D. A. (1992). Alcohol norms and expectations as predictors of alcohol use and problems in a college student sample. *The American Journal of Drug and Alcohol Abuse, 18*(4), 461-476. doi:http://dx.doi.org/10.3109/00952999209051042

World Health Organisation. (1992). F10 - F19 Mental and behavioural disorders due to psychoactive substance use *International Statistical Classification of Diseases and Related Health Problems*. Geneva: WHO.

World Health Organization. (2014). *Global status report on alcohol and health, 2014*: World Health Organization.

Yoshimoto, K., McBride, W. J., Lumeng, L., & Li, T. K. (1992). Alcohol stimulates the release of dopamine and serotonin in the nucleus accumbens. *Alcohol, 9*(1), 17-22. doi:https://doi.org/10.1016/0741-8329(92)90004-T

Young, R., Oei, T. P., & Knight, R. G. (1990). The tension reduction hypothesis revisited: An alcohol expectancy perspective. *British Journal of Addiction, 85*(1), 31-40. doi:https://doi.org/10.1111/j.1360-0443.1990.tb00621.x

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology, 9*(2, Pt.2), 1-27. doi:http://dx.doi.org/10.1037/h0025848

Zimmermann, F., & Sieverding, M. (2010). Young adults' social drinking as explained by an augmented theory of planned behaviour: The roles of prototypes, willingness, and gender. *British Journal of Health Psychology, 15*, 561-581. doi:http://dx.doi.org/10.1348/135910709x476558

Åkerlind, I., & Hörnquist, J. O. (1992). Loneliness and alcohol abuse: A review of evidences of an interplay. *Social Science & Medicine, 34*(4), 405-414. doi:https://doi.org/10.1016/0277-9536(92)90300-F

Title: Who is watching user-generated alcohol posts on social media?

Authors: Eilin K. Erevik[a], Ståle Pallesen[a], Cecilie S. Andreassen[b], Øystein Vedaa[a, c], &
Torbjørn Torsheim[a]

Affiliations:

[a]Department of Psychosocial Science, University of Bergen, Bergen, Norway

[b]Department of Clinical Psychology, University of Bergen, Bergen, Norway

[c]Department of Health Promotion, Norwegian Institute of Public Health, Bergen, Norway

Corresponding author: Eilin Erevik

Address: Department of Psychosocial Science, University of Bergen, PO. Box. 7807, 5020
Bergen, Norway

E-mail: eilin.erevik@uib.no

Tel. +4746625638

ABSTRACT

Aim: To examine students' exposure to user-generated alcohol content on social media, and identify characteristics (i.e. demographics, personality traits, alcohol use, alcohol-related cognitions, and social media factors) associated with monthly or more frequent exposure. *Methods:* College/university students ($N = 11,236$) in Bergen, Norway, completed a web-survey measuring exposure to alcohol on social media – both frequency and interpretations of alcohol content. The survey included questions regarding demographics, personality, alcohol-related cognitions, and general use of social media and alcohol. Binary logistic regressions were run to identify characteristics associated with monthly or more frequent exposure to alcohol-related posts on social media. *Results:* A total of 96.7% had been exposed to alcohol-related posts, exposure to posts with a positive valence of alcohol were most frequently reported. Reports of monthly or more frequent exposure to alcohol on social media were associated with a range of characteristics, among these younger age, being native Norwegian, lower extroversion and higher agreeableness and self-monitoring scores, higher alcohol use, stronger descriptive norms for alcohol use among online-friends, and more frequent logins to social media. *Conclusions:* Initiatives to reduce students' exposure to alcohol on social media may be warranted, and potential inflated alcohol norms should be addressed. The results suggest that exposure may be determined by high alcohol use and membership in demographical groups associated with high alcohol use, an increased attentiveness towards others' behavior, and excessive social media use. Future studies investigating the relationship between alcohol exposure on social media and later alcohol use should control for such factors.

1. Introduction

User-generated alcohol-related content, like party pictures, is salient on social media (Egan &
Moreno, 2011; Moreno et al., 2014). Several scholars have argued that alcohol exposure on
social media may cause more lenient alcohol-related cognitions (e.g. stronger perceived
norms for alcohol use or more positive alcohol attitudes), which may further increase alcohol
use (Boyle, LaBrie, Froidevaux, & Witkovic, 2016; Fournier, Hall, Ricke, & Storey, 2013). In
this realm, one can assume that the frequency of exposure is an important factor as more
frequent exposure may particularly strengthen perceived norms for alcohol use. How alcohol-
related content is interpreted (e.g. as a reflection of positive versus negative aspect of alcohol)
is likely to affect the influence exposure has on alcohol-related cognitions as well. The
relationship between alcohol exposure and alcohol use may also be explained by common
factors (e.g. demographic characteristics) predicting both exposure and alcohol use (Boyle et
al., 2016). Hence, identifying characteristics associated with alcohol exposure on social media
could give an indication of how exposure relates to alcohol use. Very few studies have
investigated frequency of exposure, the interpretation of the content, and characteristics (e.g.
demographics, personality traits) associated with exposure.

*1.1. How common is exposure to user-generated alcohol posts, and how is such posts
interpreted?*

One study found that 20% of adolescents reported to have at least one friend on social media
that had posted party pictures (Huang, Unger, et al., 2014), while another study reported that
North American undergraduate students on average responded that their *Facebook*-friends
posted alcohol-related content between "less than once a month" and "monthly" (Westgate,
Neighbors, Heppner, Jahn, & Lindgren, 2014). Regarding the viewers' interpretation of

alcohol-related posts, one study suggested that the viewers of alcohol-related posts on social media understand such posts as reflections of the sender's offline alcohol use (Moreno, Briner, Williams, Walker, & Christakis, 2009).

1.2. Who is watching alcohol posts on social media?

Demographic characteristics, the Five-Factor Model's personality traits and self-monitoring could predict both social media use and alcohol use in general (Correa, Hinsley, & De Zuniga, 2010; Erevik, Pallesen, Vedaa, Andreassen, & Torsheim, 2017; Kim, Seely, & Jung, 2017; Rider, 2006). Few studies have investigated whether demographic or personality characteristics could be associated with exposure to alcohol on social media, but one study indicated that women are exposed to alcohol-related posts more frequently than men (Boyle et al., 2016). In addition to the potential association between exposure and demographic and personality characteristics, exposure to alcohol-related social media content has been consistently linked to elevated alcohol use and lenient alcohol-related cognitions (Boyle et al., 2016). According to the prototype/willingness model, an individual's health choices are determined in part by the individual's evaluations of the typical conductor of such behavior (i.e. prototype) and how common the individual perceive the behavior to be (i.e. descriptive norms) (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Rivis, Sheeran, & Armitage, 2006). Experimental studies have suggested that exposure to alcohol on social media may drive prototypic evaluations and descriptive norms of alcohol use in a more lenient direction (Fournier et al., 2013; Litt & Stock, 2011). The relationship may, however, be bidirectional, as individuals with more lenient alcohol-related cognitions may be more likely to notice alcohol-related content on social media in order to confirm preconceived cognitions (Wason, 1968).

The way social media is used could also influence the amount of exposure to alcohol-related content. For instance has previous studies indicated that individuals with more online-friends reports more exposure to alcohol on social media, compared to individuals with fewer online-friends (Boyle et al., 2016; Westgate et al., 2014). Finally, exposure of alcohol-related content on social media might be associated with increased disclosure of similar posts due to friendship selection processes and social learning (Bandura, 1965; Huang, Soto, Fujimoto, & Valente, 2014).

1.3. Objectives

The current study aimed to investigate students' exposure to user-generated alcohol-related posts on different social media (i.e. frequency of exposure and interpretations of alcohol-related posts). The second aim was to identify demographic, personality, alcohol habits and cognitions, and social media factors associated with monthly or more frequent exposure to alcohol-related posts on social media.

2. Methods

2.1. Procedures and sample

Students registered at the four largest institutions for higher education in Bergen municipality, Norway, were invited to participate in an online survey during fall 2015. A total of 28,553 students received an e-mail invitation, whereof 11,236 (39.4%) agreed to participate. The students were given information about the study, data-storage and use, potential risk and benefits associated with participation, and their right to abstain from participation before they

could chose to respond to the survey. The project was approved by the Regional Committee for Medical and Health Research Ethics, Western Norway (no. 2015/1154).

2.2. Measures

Demographics were assessed by questions about sex, place of birth, religious identification, relationship status, year of birth, and parental status. *Personality* was measured with the Mini-International Personality Item Pool (Mini-IPIP; 20 items), which is considered a reliable and valid measure of the Five-Factor Model's personality traits (Donnellan, Oswald, Baird, & Lucas, 2006). In the current study the Cronbach's alphas of the five subscales were acceptable: Extroversion (.83), agreeableness (.77), conscientiousness (.69), neuroticism (.75), and intellect/imagination (.74). *Self-monitoring* was assessed by the 13 items revised Self-Monitoring Scale (Lennox & Wolfe, 1984), Cronbach's alpha: .82 (current study).

Alcohol use was assessed by the Alcohol Use Disorders Identification Test (AUDIT; 10 items) (Bohn, Babor, & Kranzler, 1995), Cronbach's alpha: .78 (current study). *Descriptive norms of alcohol use* were assessed by the following questions: "Think about the five students you know best. How many of them do you think drink": a) "a couple of times a week?", b) "10 units or more on a typical drinking occasion?", and c) "6 units or more (on the same occasion) a couple of times a week?" (Response range: 0-5 students) (based on: Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Miller, Prichard, Hutchinson, & Wilson, 2014; Tickle, Hull, Sargent, Dalton, & Heatherton, 2006). *Descriptive norms of alcohol use among online-friends* were measured by similar questions, but for these questions, the students were asked to think about the five persons of which they see most social media content from. *Prototypes* of the typical high-intake drinker and poster of alcohol content were measured by the questions: "What is your overall impression of the typical student that": a) "drinks 6 units

or more on a regular drinking night?", and b) "posts alcohol-related content on social media (e.g. party pictures)?" Response alternatives ranged from 1 (extremely negative) to 10 (extremely positive) (Todd & Mullan, 2011).

Social media use was assessed by the following questions: "Do you have a social media account?", "How often do you login to social media?" (seldom/never; less than 1 time a week; 1 time a week; 2-3 times a week; 4-6 times a week; 1-2 times a day; over 3 times a day), and "About how many friends or followers do you have on the social media site you use the most?" (type number), (Karl, Peluchette, & Schlaegel, 2010). *Disclosures of alcohol-related content on social media* were assessed by the following questions: "How often do you post content on social media that": a) "Refers to positive consequences of alcohol use (e.g. increased pleasure, social cohesion, relaxation)?", and b) "Refers to negative consequences of alcohol use (e.g. hangovers, loss of control, hangover anxiety)?" (Never; I`ve done it before, but not lately; less than once a month; every month; a couple times a month; every week; a couple times a week; daily or almost daily). *Exposure to alcohol-related posts on social media* was measured by several questions. The participants were instructed to think only of posts etc. from social media users. The participants were asked to report total amount of exposure on social media across different social media sites/apps. "Have your friends or the individuals you follow on social media ever posted something related to alcohol (text or images, e.g. party pictures)?". Those who answered "yes" were asked continual questions about frequency of exposure to specific types of alcohol-related posts. "How often do you see posts (text or images) on social media that": a) "Refers to positive consequences of alcohol use (e.g. increased pleasure, social cohesion, relaxation)?", b) "Implies that a person is drinking a few units for coziness and taste?", c) "Implies that a person is drinking several units on a social gathering?", d) "Implies that a person is drinking on a weekday?", e) "Refers to negative consequences of alcohol use (e.g. hangovers, loss of control, hangover anxiety)?",

and f) "Implies that a person is drinking alone (e.g. before going to a party)?". (Response alternatives: Never; I`ve seen it before, but not lately; less than once a month; every month; a couple times a month; every week; a couple times a week; daily or almost daily).

2.3. Analyses

Data analyses were conducted with *IBM SPSS Statistics 23*. Missing data were deleted listwise. The *n* varies somewhat in the different analyses due to non-response on some of the included variables. Participants without a social media account (239 participants) were excluded from the analyses of alcohol exposure altogether. Descriptive analyses were run to assess sample characteristics. Further descriptive analyses were conducted to investigate how alcohol content was interpreted; the students who reported never to see alcohol content on social media (315 participants) were excluded from these analyses.

Finally, two binary logistic regression models were conducted to examine characteristics associated with monthly or more exposure to alcohol-related posts. The dependent variables were derived from two exposure items: a) "How often do you see posts on social media that refers to positive consequences of alcohol use (e.g. increased pleasure, social cohesion, relaxation)?", and b) "How often do you see posts on social media that refers to negative consequences of alcohol use (e.g. hangovers, loss of control, hangover anxiety)?". These two items were chosen as they represent overreaching categories of the valence of alcohol-related exposure. Exposure less often than once a month (i.e. "never", "not anymore" or "less than once a month") comprised the reference category. Monthly or more frequent exposure (i.e. "monthly", "a couple times a month", "weekly", "a couple times a week", or "daily or almost daily") constituted the outcome category.

Categorical independent variables were dichotomous or dichotomized before the regression modeling, these variables were: sex (man vs. woman), place of birth (countries outside of Norway vs. Norway), religious identification (religious vs. nonreligious), relationship status (in a relationship vs. single), and parental status (have children vs. do not have children). The continuous independent variables were transformed into z-scores, including: personality traits, self-monitoring, alcohol use (AUDIT-score), descriptive norms of alcohol use among co-students and among online-friends, prototypic apprehension of the typical high-intake drinker and of the typical sharer of alcohol-related content on social media, frequency of logins on social media, number online-friends, and frequency of disclosure of alcohol-related content on social media displaying positive and negative aspects of alcohol use. Z-scores were used to make it easier to compare regression coefficients across different independent variables. The descriptive norm variables for drinking among co-students and online-friends were computed by adding the responses to the three descriptive norm questions. The variable number of online-friends had several outliers; to reduce the effect of these, the variable was log-transformed before conducting the regression modeling.

3. Results

Table 1 shows the sample's demographic and personality characteristics, mean AUDIT-score, and responses regarding alcohol-related social cognition and social media-use. The mean age was 24.9 years ($SD = 6.5$), 63.3% were women, and the majority were born in Norway (92.4%).

Table 1 Sample characteristics, $N = 11,236$

	Mean or percentage	SD
Demographics		
Woman	63.3%	
Born in Norway	92.4%	

Religious identification	34.8%	
Without partner	47.3%	
Age	24.9	6.5
Have child/ren	11.5%	
Personality[a]		
Extroversion	14.1	3.6
Agreeableness	16.8	2.8
Conscientiousness	14.7	3.2
Neuroticism	11.0	3.6
Intellect/imagination	14.6	3.2
Self-monitoring[b]		
Self-monitoring score	40.1	7.8
Alcohol use[c]		
AUDIT-score	8.2	4.9
Alcohol-related social cognitions		
Number of 5 closest co-students that drink a couple of times a week	1.9	1.5
Number of 5 closest co-students that typically drink 10 alcohol units or more	0.8	1.2
Number of 5 closest co-students that drink 6 units or more a couple of times a week	0.9	1.3
Prototype of typical high-intake drinker[d]	5.0	1.4
Number of 5 closest online-friends that drink a couple of times a week	1.8	1.4
Number of 5 closest online-friends that typically drink 10 alcohol units or more	0.9	1.2
Number of 5 closest online-friends that drink 6 units or more a couple of times a week	1.0	1.3
Prototype of typical sharer of alcohol-related posts on social media[d]	4.7	1.4
Social media use and alcohol-related disclosures among the social media users (i.e. 97.6%)		
Frequency of login to social media[e]	6.7	0.9
Number of online-friends	598.2	10265.3
Disclosure on social media depicting positive aspects of alcohol use[f]	2.2	1.2
Disclosure on social media depicting negative aspects of alcohol use[f]	1.5	0.9

AUDIT Alcohol Use Disorders Identification Test
[a] Total score range from 5-20 for each trait, [b] Total score range from 0-65, [c] Total score range from 0-40,
[d] Total score range from 1 (extremely negative)-10 (extremely positive),
[e] 1=Seldom/never, 2= Less than 1 time a week, 3=1 time a week, 4=2-3 times a week, 5= 4-6 times a week, 6=1-2 times a day, 7=Over 3 times a day,
[f] 1=Never, 2=Done it before, but not lately, 3=Less than once a month, 4=Monthly, 5=A couple times a month, 6=Weekly, 7=A couple times a week, 8=Daily or almost daily

3.1 Frequencies of exposure and content in alcohol-related posts

Table 2 demonstrates the students' reports regarding frequency of exposure to different types of alcohol-related posts on social media among the students that reported alcohol exposure. Monthly or more frequent exposure to posts depicting positive aspects of alcohol use was most commonly reported (by 80.7%). In sum, 77.3% reported monthly or more frequent exposure to posts implying low to moderate alcohol intake (i.e. drinking a few units), whereas 75.2% reported monthly or more frequent exposure to posts implying moderate to high alcohol intake (i.e. drinking several units). A total of 51.8% of the students reported monthly or more frequent exposure to posts implying weekday-drinking. In sum, 40.1% reported monthly or more frequent exposure to posts depicting negative aspects of alcohol use,

whereas 20.9% reported monthly or more frequent exposure to posts implying that the sender was drinking alone.

Table 2 Exposure to different types of alcohol-related posts on social media among the students that reported having been exposed to alcohol-related posts on social media, n = 9,134.

Variable	Never or not anymore % (95% CI)	Less than once a month % (95% CI)	1-3 times a month % (95% CI)	Weekly or a couple times a week % (95% CI)	Daily or almost daily % (95% CI)
Posts that refers to positive consequences of alcohol	6.3 (5.8-6.8)	13.1 (12.4-13.7)	40.0 (39.0-41.0)	37.9 (36.9-38.9)	2.8 (2.5-3.2)
Posts that implies drinking a few units	4.3 (3.9-4.7)	18.7 (17.9-19.5)	49.5 (48.5-50.5)	26.0 (25.1-26.9)	1.6 (1.3-1.8)
Posts that implies drinking several units	6.7 (6.2-7.2)	18.1 (17.3-18.9)	42.4 (41.3-43.4)	31.2 (30.3-32.2)	1.6 (1.3-1.8)
Posts that implies drinking on weekdays	18.3 (17.5-19.1)	29.8 (28.9-30.8)	35.9 (34.9-36.9)	14.8 (14.1-15.6)	1.1 (0.9-1.3)
Posts that refers to negative consequences of alcohol	21.3 (20.4-22.1)	38.7 (37.7-39.7)	30.2 (29.3-31.2)	9.5 (8.9-10.1)	0.4 (0.3-0.5)
Posts that implies drinking alone	41.5 (40.5-42.6)	37.6 (36.6-38.6)	17.0 (16.2-17.7)	3.7 (3.3-4.1)	0.2 (0.1-0.3)

CI confidence interval

3.2. Characteristics associated with exposure to alcohol-related posts

The exponentiated regression coefficients of exposure regressed on viewers' characteristics in terms of demographics, personality factors, alcohol use, alcohol-related cognitions, and social media-use are shown in table 3.

Monthly or more frequent exposure to content interpreted as a reflection of positive consequences of alcohol was associated with being born in Norway, nonreligious identification, younger age, lower extroversion scores, higher agreeableness scores, and higher self-monitoring scores. The students who reported monthly or more frequent exposure to content interpreted as a reflection of positive consequences of alcohol were also more likely to report higher alcohol use, stronger descriptive norms for alcohol use among online-friends, favorable prototypic evaluations of the typical poster of alcohol content, more

frequent logins to social media, having more online-friends, and more frequent social media disclosures of content referring to positive aspects of alcohol.

Monthly or more frequent exposure to content describing negative consequences of alcohol was associated with being born in Norway, religious identification, younger age, and higher self-monitoring scores. The students who reported monthly or more frequent exposure to negative consequences of alcohol were also more likely to report higher alcohol use, stronger descriptive norms for alcohol use among online-friends, unfavorable prototypic evaluations of the typical poster of alcohol content, more frequent logins to social media, having more online-friends, and more frequent social media disclosures of content referring to negative aspects of alcohol.

Table 3 Demographic, personality and social factors related to exposure to alcohol-related posts on social media.
Adjusted logistic regressions, total $n = 9,169$ (reference category: less than once a month, not anymore, or never, OR = 1)

Independent variables	Monthly or more frequent exposure to posts that refers to positive consequences of drinking OR (95% CI)	Monthly or more frequent exposure to posts that refers to negative consequences of drinking OR (95% CI)
Demographic		
Sex		
Man	1.00	1.00
Woman	1.10 (0.96-1.25)	0.96 (0.85-1.07)
Place of birth		
Country outside of Norway	1.00	1.00
Norway	1.51 (1.25-1.83)[***]	1.23 (1.02-1.48)[*]
Religious identification		
Religious	1.00	1.00
Nonreligious	1.15 (1.02-1.29)[*]	0.89 (0.81-0.98)[*]
Relationship status		
In a relationship	1.00	1.00
Single	0.90 (0.80-1.01)	0.93 (0.84-1.02)
Age Z	0.92 (0.85-0.99)[*]	0.69 (0.63-0.74)[***]
Parental status		
have child/ren	1.00	1.00
No child/ren	1.03 (0.82-1.30)	1.00 (0.80-1.24)
Personality		
Extroversion Z	0.92 (0.86-0.98)[*]	0.99 (0.94-1.04)
Agreeableness Z	1.10 (1.04-1.17)[**]	0.99 (0.94-1.04)
Conscientiousness Z	0.99 (0.93-1.05)	0.99 (0.95-1.04)
Neuroticism Z	1.01 (0.95-1.07)	1.02 (0.97-1.08)
Intellect/imagination Z	1.01 (0.95-1.07)	1.01 (0.96-1.06)
Self-monitoring scale revised	1.12 (1.05-1.18)[***]	1.11 (1.05-1.16)[***]
Alcohol use		
Alcohol use Z (AUDIT-score)	1.20 (1.11-1.29)[***]	1.08 (1.01-1.14)[*]
Alcohol-related social cognitions		
Descriptive norms for alcohol use, co-students Z	0.99 (0.91-1.07)	1.04 (0.98-1.11)
Prototypic apprehension of the typical high-intake drinker Z	0.99 (0.92-1.05)	0.99 (0.94-1.04)
Descriptive norms for alcohol use, online-friends Z	1.12 (1.03-1.21)[**]	1.18 (1.11-1.26)[***]
Prototypic apprehension typical poster of alcohol-related contentZ	1.14 (1.07-1.22)[***]	0.92 (0.88-0.97)[**]
Social media use and alcohol-related disclosures		

Frequency of login to social media Z	1.07 (1.02-1.12)[**]	1.06 (1.01-1.11)[*]
Number of online-friends (log-transformed) Z	1.22 (1.15-1.29)[***]	1.09 (1.04-1.15)[**]
Disclosure of content on social media depicting positive aspects of alcohol Z	2.58 (2.36-2.81)[***]	0.99 (0.94-1.06)
Disclosure of content on social media depicting negative aspects of alcohol Z	0.99 (0.91-1.08)	1.75 (1.66-1.85)[***]
Model df = 21, p < .001 for all	χ^2 = 1558.595 Cox & Snell = .156; NagelkerkeR^2 = .241	χ^2 = 1147.620 Cox & Snell = .118; NagelkerkeR^2 = .160

OR odds ratio, *CI* confidence interval, *Z* the variable was based on z-scores, [*] $p < .05$, [**] $p < .01$, [***] $p < .001$

4. Discussion

The amount of exposure reported by the current sample was quite massive. The negative aspects of alcohol use might be under-communicated in the alcohol-related posts. Exposure to alcohol-related posts may result in more lenient alcohol-related cognitions (e.g. perceived norms for alcohol use) and increase consumption (Boyle et al., 2016; Fournier et al., 2013). According to Bandura (1965)'s social learning theory observers are more likely to imitate behavior which is positively reinforced (e.g. alcohol use being rewarded by social cohesion), compared to behavior which result in unwanted consequences (e.g. alcohol use being followed by hangovers). Hence, content referring to positive aspects of alcohol may assert a stronger influence over the viewers alcohol use, compared to content referring to negative aspects. The current results suggest as such that initiatives to reduce students' exposure to alcohol on social media may be warranted, and that potential inflated alcohol norms should be addressed. The identified characteristics provide an indication as to which individuals that should be the targeted in campaigns seeking to counter message user-generated alcohol exposure (e.g. younger adults).

4.1. Determinants of alcohol exposure on social media

High alcohol use, lenient alcohol cognitions, and membership in demographical groups associated with high alcohol use (i.e. younger, native Norwegian and nonreligious students) were positively associated with reports of exposure to alcohol content. The association

between demographical characteristics and alcohol exposure on social media has previously not been reported. Individuals with higher alcohol consumption and more lenient alcohol cognitions may report more exposure due to attentional biases for alcohol content and friendship selection processes (Field, Mogg, Zetteler, & Bradley, 2004; Huang, Soto, et al., 2014), while belonging to demographical groups associated with high alcohol use may result in more exposure due to alcohol use being common and accepted in their social network (Erevik, Pallesen, et al., 2017). It should be noted that exposure to content interpreted as a reflection of negative aspects of alcohol was associated with religious identification and unfavorable prototypic evaluations of the typical sharer. This finding may be explained by preconceived negative attitudes towards alcohol or alcohol postings (Wason, 1968).

Further, exposure to alcohol on social media was positively associated with personality traits which may of different reasons also be associated with an increased tendency to observe or be attentive of others' behavior in social settings, i.e. lower extroversion scores and higher agreeableness and self-monitoring scores (Ashton, Lee, & Paunonen, 2002; McCrae & John, 1992; Nettle, 2006; Snyder, 1974). These findings are all novel. Increased attentiveness towards others' behavior may result in a higher awareness for others' social media content in general (including alcohol-related content).

Finally, monthly or more exposure was associated with variables which suggest increased social media investment (i.e. more frequent logins to social media, more online-friends, and reports of more disclosure of alcohol on social media). Excessive social media users are expected to be more exposed to all types of social media content, including alcohol-related content (Boyle et al., 2016). Disclosure of alcohol on social media comprised the independent variable that showed the strongest association to exposure of all the independent variables included in the current study. This finding may suggest that alcohol-related content

could become increasingly salient in given online networks, for instance due to imitation processes (Bandura, 1965; Erevik, Torsheim, Vedaa, Andreassen, & Pallesen, 2017).

4.2. Implications for future studies

Several of the characteristics which were associated with exposure have also been associated with elevated alcohol use (i.e. young age, being native Norwegian, nonreligious identification, lenient alcohol-related cognitions, and excessive social media use), while some have been negatively associated with alcohol use (i.e. lower extroversion and higher agreeableness scores) (Andersson, Johnsson, Berglund, & Ojehagen, 2007; Erevik, Pallesen, et al., 2017; Malouff, Thorsteinsson, Rooke, & Schutte, 2007; Merenakk et al., 2003; Michalak, Trocki, & Bond, 2007; Nedregård & Olsen, 2014; Perkins, 2007; Westgate et al., 2014). The current findings suggest as such that studies investigating the relationship between alcohol exposure on social media and later alcohol use should control for such factors. Some of the identified characteristics associated with exposure may act as common factors in the relationship between alcohol use and exposure. For instance, could more disclosure of alcohol on social media result in an increased awareness of others alcohol content as well as an increased alcohol use due to social self-fulfilling prophecies (Rosenthal, 1985). The association between alcohol disclosure on social media and alcohol exposure may as such explain the relationship between exposure and later alcohol use reported in other studies (Boyle et al., 2016; Huang, Unger, et al., 2014). Investigating potential common factors may be an interesting inquiry for future research.

4.3. Limitations and strengths

The cross-sectional design of the present study precludes conclusions about directionality and causality. Furthermore, the current study is based on the students' reports of exposure to alcohol-related content, and the accuracy of self-report measurements of alcohol-related social media exposure is unknown (Groth, Longo, & Martin, 2017). The items regarding exposure to alcohol on social media were further developed for the purpose of the current study, hence their psychometric properties are not known. It should also be noted that the included variables explained a limited amount of variance in the exposure variables (between 16 and 24%). Including variables such as time spent on social media and additional alcohol-related cognitions (e.g. alcohol identity) might have increased the explained variance. Finally, the response rate (i.e. 39.4%) may be considered as somewhat low, although it is in line with the response rate obtained in similar studies (Nedregård & Olsen, 2014; Sheehan, 2001). Furthermore, the current sample had similar characteristics as other Norwegian student samples (e.g. in terms of sex, age, and relationship status) (Nedregård & Olsen, 2014; Statistisk sentralbyrå, 2017). Hence, the results from the present study are likely to be generalizable to the Norwegian student population. Student populations worldwide have been suggested to be quite a homogeneous group (Gargano, 2009), which may indicate that the current results might be applicable to student populations in other countries as well.

The current study is among the first to examine the frequency of exposure to alcohol-related posts on social media and the viewers' apprehensions of the underlying meaning of the alcohol-related posts. Furthermore, the investigation of characteristics associated with reports of exposure is also a quite novel inquest. The association between different demographical and personality characteristics and exposure to alcohol on social media has, to our knowledge, previously not been reported. As such, this study contributes with new knowledge about a phenomenon affecting the vast majority of students quite frequently. The large sample size is another asset of the present study.

5. Conclusion

The level of exposure to alcohol-related posts among students is substantial. Initiatives to reduce students' exposure to alcohol on social media may be warranted, and potential inflated alcohol norms should be addressed. Individuals who have high alcohol use and belong to demographical groups associated with elevated alcohol use, have an increased attentiveness towards others' behavior, and use social media more excessively may be more prone to be attentive of and exposed to alcohol-related posts on social media. Future studies investigating the relationship between alcohol exposure on social media and later alcohol use should control for such factors.

References

Andersson, C., Johnsson, K. O., Berglund, M., & Ojehagen, A. (2007). Alcohol involvement in Swedish university freshmen related to gender, age, serious relationship and family history of alcohol problems. *Alcohol and Alcoholism, 42*(5), 448-455. doi:http://dx.doi.org/10.1093/alcalc/agm008

Ashton, M. C., Lee, K., & Paunonen, S. V. (2002). What is the central feature of extraversion? Social attention versus reward sensitivity. *Journal of personality and social psychology, 83*(1), 245-252. doi:http://dx.doi.org/10.1037/0022-3514.83.1.245

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test: Guidelines for use in primary care*. www.who.int: World Health Organization.

Bandura, A. (1965). Vicarious processes: A case of no-trial learning. *Advances in experimental social psychology, 2*, 1-55. doi:https://doi.org/10.1016/S0065-2601(08)60102-1

Bohn, M. J., Babor, T. F., & Kranzler, H. R. (1995). The Alcohol Use Disorders Identification Test (AUDIT): validation of a screening instrument for use in medical settings. *Journal of studies on alcohol, 56*(4), 423-432. doi:http://dx.doi.org/10.15288/jsa.1995.56.423

Boyle, S. C., LaBrie, J. W., Froidevaux, N. M., & Witkovic, Y. D. (2016). Different digital paths to the keg? How exposure to peers' alcohol-related social media content influences drinking among male and female first-year college students. *Addictive behaviors, 57*, 21-29. doi:http://dx.doi.org/10.1016/j.addbeh.2016.01.011

Correa, T., Hinsley, A. W., & De Zuniga, H. G. (2010). Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior, 26*(2), 247-253. doi:https://doi.org/10.1016/j.chb.2009.09.003

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The Mini-IPIP scales: Tiny-yet-effective measures of the big five factors of personality. *Psychological Assessment, 18*(2), 192-203. doi:http://dx.doi.org/10.1037/1040-3590.18.2.192

Egan, K. G., & Moreno, M. A. (2011). Alcohol references on undergraduate males' Facebook profiles. *American Journal of Men's Health, 5*(5), 413-420. doi:http://dx.doi.org/10.1177/1557988310394341

Erevik, E. K., Pallesen, S., Vedaa, Ø., Andreassen, C. S., & Torsheim, T. (2017). Alcohol use among Norwegian students: Demographics, personality and psychological health correlates of drinking patterns. *Nordic Studies on Alcohol and Drugs*. doi:http://dx.doi.org/10.1177/1455072517709918

Erevik, E. K., Torsheim, T., Vedaa, Ø., Andreassen, C. S., & Pallesen, S. (2017). Sharing of alcohol-related content on social networking sites: Frequency, content and correlates. *Journal of Studies on Alcohol and Drugs, 78*(4), 608-616. doi:https://doi.org/10.15288/jsad.2017.78.608

Field, M., Mogg, K., Zetteler, J., & Bradley, B. P. (2004). Attentional biases for alcohol cues in heavy and light social drinkers: the roles of initial orienting and maintained attention. *Psychopharmacology, 176*(1), 88-93. doi:http://dx.doi.org/10.1007/s00213-004-1855-1

Fournier, A. K., Hall, E., Ricke, P., & Storey, B. (2013). Alcohol and the social network: Online social networking sites and college students' perceived drinking norms. *Psychology of Popular Media Culture, 2*(2), 86-95. doi:http://dx.doi.org/10.1037/a0032097

Gerrard, M., Gibbons, F. X., Houlihan, A. E., Stock, M. L., & Pomery, E. A. (2008). A dual-process approach to health risk decision making: The prototype willingness model. *Developmental Review, 28*(1), 29-61. doi:http://dx.doi.org/10.1016/j.dr.2007.10.001

Groth, G. G., Longo, L. M., & Martin, J. L. (2017). Social media and college student risk behaviors: A mini-review. *Addictive behaviors, 65*, 87-91. doi:https://doi.org/10.1016/j.addbeh.2016.10.003

Huang, G. C., Soto, D., Fujimoto, K., & Valente, T. W. (2014). The Interplay of Friendship Networks and Social Networking Sites: Longitudinal Analysis of Selection and Influence Effects on Adolescent Smoking and Alcohol Use. *American Journal of Public Health, 104*(8), e51-e59. doi:http://dx.doi.org/10.2105/AJPH.2014.302038

Huang, G. C., Unger, J. B., Soto, D., Fujimoto, K., Pentz, M. A., Jordan-Marsh, M., & Valente, T. W. (2014). Peer influences: The impact of online and offline friendship networks on adolescent smoking and alcohol Use. *Journal of Adolescent Health,*

54(5), 508-514. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1016/j.jadohealth.2013.07.001

Karl, K., Peluchette, J., & Schlaegel, C. (2010). Who's posting Facebook faux pas? A cross-cultural examination of personality differences. *International Journal Of Selection And Assessment, 18*(2), 174-186. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1111/j.1468-2389.2010.00499.x

Kim, D. H., Seely, N. K., & Jung, J.-H. (2017). Do you prefer, Pinterest or Instagram? The role of image-sharing SNSs and self-monitoring in enhancing ad effectiveness. *Computers in Human Behavior, 70*, 535-543. doi:https://doi.org/10.1016/j.chb.2017.01.022

Lennox, R. D., & Wolfe, R. N. (1984). Revision of the self-monitoring scale. *Journal of Personality and Social Psychology, 46*(6), 1349-1364. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1037/0022-3514.46.6.1349

Litt, D. M., & Stock, M. L. (2011). Adolescent alcohol-related risk cognitions: The roles of social norms and social networking sites. *Psychology of Addictive Behaviors, 25*(4), 708-713. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1037/a0024226

Malouff, J. M., Thorsteinsson, E. B., Rooke, S. E., & Schutte, N. S. (2007). Alcohol involvement and the five-factor model of personality: A meta-analysis. *Journal of Drug Education, 37*(3), 277-294. doi:http://dx.doi.org/10.2190/DE.37.3.d

McCrae, R. R., & John, O. P. (1992). An introduction to the 5-factor model and its applications. *Journal of Personality, 60*(2), 175-215. doi:http://dx.doi.org/10.1111/j.1467-6494.1992.tb00970.x

Merenakk, L., Harro, M., Kiive, E., Laidra, K., Eensoo, D., Allik, J., . . . Harro, J. (2003). Association between substance use, personality traits, and platelet MAO activity in

preadolescents and adolescents. *Addictive Behaviors, 28*(8), 1507-1514.

doi:http://dx.doi.org/10.1016/s0306-4603(02)00270-8

Michalak, L., Trocki, K., & Bond, J. (2007). Religion and alcohol in the US National Alcohol

Survey: How important is religion for abstention and drinking? *Drug and Alcohol*

Dependence, 87(2-3), 268-280.

doi:http://dx.doi.org/10.1016/j.drugalcdep.2006.07.013

Miller, J., Prichard, I., Hutchinson, A., & Wilson, C. (2014). The relationship between

exposure to alcohol-related content on Facebook and predictors of alcohol

consumption among female emerging adults. *Cyberpsychology Behavior and Social*

Networking, 17(12), 735-741. doi:http://dx.doi.org/10.3758/s13428-014-0533-

410.1089/cyber.2014.0337

Moreno, M. A., Briner, L. R., Williams, A., Walker, L., & Christakis, D. A. (2009). Real use

or "real cool": Adolescents speak out about displayed alcohol references on social

networking websites. *Journal of Adolescent Health, 45*(4), 420-422.

doi:http://dx.doi.org/10.1016/j.jadohealth.2009.04.015

Moreno, M. A., D'Angelo, J., Kacvinsky, L. E., Kerr, B., Zhang, C., & Eickhoff, J. (2014).

Emergence and predictors of alcohol reference displays on Facebook during the first

year of college. *Computers in Human Behavior, 30*, 87-94.

doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1016/j.chb.2013.07.060

Nedregård, T., & Olsen, R. (2014). Studentenes helse- og trivselsundersøkelse 2014.

[Students' Health and Wellbeing Survey 2014]. Retrieved from:

http://www.google.no/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=

0CB0QFjAA&url=http%3A%2F%2Fwww.vtbergen.no%2Fwp-

content%2Fuploads%2F2013%2F10%2FVT0614_6214_SHoT2014.pdf&ei=w21HVZ

vGEIOvswG8woGQDw&usg=AFQjCNESqBK5IcWkVZUNzMxPA7ANwM2HzA&sig2=CahhInSPe7w4ZBNAUWdXiA

Nettle, D. (2006). The evolution of personality variation in humans and other animals. *American Psychologist, 61*(6), 622-631. doi:http://dx.doi.org/10.1037/0003-066X.61.6.622

Perkins, H. W. (2007). Misperceptions of peer drinking norms in Canada: Another look at the "reign of error" and its consequences among college students. *Addictive Behaviors, 32*(11), 2645-2656. doi:http://dx.doi.org/10.3758/s13428-014-0533-410.1016/j.addbeh.2007.07.007

Rider, R. (2006). *The Interaction of Peer Influence and Self-Presentation in College Students' Alcohol Consumption* (Doctoral dissertation, University of Maryland), . Retrieved from http://drum.lib.umd.edu/handle/1903/3816

Rivis, A., Sheeran, P., & Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology, 11*, 483-500. doi:http://dx.doi.org/10.1348/135910705x70327

Rosenthal, R. (1985). From unconscious experimenter bias to teacher expectancy effects. *Teacher expectancies*, 37-65.

Sheehan, K. B. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication, 6*(2), 0-0. doi:http://dx.doi.org/10.1111/j.1083-6101.2001.tb00117.x

Snyder, M. (1974). Self-monitoring of expressive behavior. *Journal of Personality and Social Psychology, 30*(4), 526-537. doi:http://dx.doi.org/10.1037/h0037039

Statistisk sentralbyrå. (2017). Studenter i høyere utdanning [Students in higher education]. Retrieved from https://www.ssb.no/utdanning/statistikker/utuvh

Tickle, J. J., Hull, J. G., Sargent, J. D., Dalton, M. A., & Heatherton, T. F. (2006). A structural

    equation model of social influences and exposure to media smoking on adolescent

    smoking. *Basic and Applied Social Psychology, 28*(2), 117-129.

    doi:http://dx.doi.org/10.1207/s15324834basp2802_2

Todd, J., & Mullan, B. (2011). Using the theory of planned behaviour and prototype

    willingness model to target binge drinking in female undergraduate university

    students. *Addictive Behaviors, 36*(10), 980-986.

    doi:http://dx.doi.org/10.1016/j.addbeh.2011.05.010

Wason, P. C. (1968). Reasoning about a rule. *The Quarterly journal of experimental*

    psychology, 20(3), 273-281. doi:http://dx.doi.org/10.1080/14640746808400161

Westgate, E. C., Neighbors, C., Heppner, H., Jahn, S., & Lindgren, K. P. (2014). "I will take a

    shot for every 'like' I get on this status": Posting alcohol-related Facebook content is

    linked to drinking outcomes. *Journal of Studies on Alcohol and Drugs, 75*(3), 390-

    398. doi:http://dx.doi.org/10.15288/jsad.2014.75.390

1 # Disclosure and Exposure of Alcohol on Social Media and Later
2 # Alcohol Use: A Large-Scale Longitudinal Study

3

4 **Eilin K. Erevik[1*], Torbjørn Torsheim[1], Cecilie S. Andreassen[2], Øystein Vedaa[1, 3], &**
5 **Ståle Pallesen[1]**

6

7 [1]Department of Psychosocial Science, University of Bergen, Bergen, Norway
8 [2]Department of Clinical Psychology, University of Bergen, Bergen, Norway
9 [3]Department of Health Promotion, Norwegian Institute of Public Health, Bergen, Norway

10

11 *** Correspondence:**
12 Eilin Erevik
13 eilin.erevik@uib.no

14

15 **Keywords: social networking sites, social media, alcohol, exposure, disclosure, students.**

16

17

18 Running head: Alcohol Disclosures and Exposure on Social media and Alcohol use
19 Word count: 4,094
20 Tables: 4

21

22

23

24

25

26

27

28

29

30

31

32

33 **ABSTRACT**

34 This article aims to investigate whether alcohol-related disclosure and exposure on social
35 media can predict later alcohol use, and to identify covariates in these relationships. Data
36 were collected by online surveys (two waves) among students in Bergen, Norway. The first
37 survey was administered in fall 2015. The follow-up took place during fall 2016. A total of
38 5,217 students participated in both waves. The surveys included questions about
39 demographics, personality, alcohol use, alcohol-related cognitions (e.g., attitudes and norms),
40 social media use, and disclosure and exposure of alcohol on social media. Bivariate
41 comparisons were conducted to assess differences in alcohol use between the frequent (i.e.,
42 monthly or more often) disclosure and exposure groups and low-frequent disclosure and
43 exposure groups. Crude and adjusted linear regressions were employed to investigate if
44 disclosure and exposure of alcohol could predict later alcohol use, when controlling for a
45 range of covariates. Compared to the low-frequent disclosure and exposure groups,
46 participants which frequently disclosed or were frequently exposed to alcohol-related content
47 had higher alcohol use at baseline and one year later ($p < .001$), when no covariates were
48 controlled for. Frequent disclosure of content reflecting positive aspects of alcohol predicted
49 stable or slightly increased alcohol use at Time 2 ($p < .01$), even when all covariates (i.e.,
50 demographics, personality, alcohol use, alcohol-related cognitions, and social media use)
51 were controlled for. In conclusion, frequent disclosure and/or exposure to alcohol-related
52 content predicted alcohol use over time. Alcohol disclosure/exposure on social media could
53 for the most part not predict later alcohol use when baseline alcohol use was controlled for.
54 High alcohol use and alcohol disclosure/exposure on social media appear to be strongly
55 intertwined, which hampers identification of directionality between alcohol use and
56 disclosure/exposure. Disclosing content reflecting positive aspects of alcohol was the only
57 independent variable that could predict further alcohol use when other factors, like baseline
58 alcohol use, were held constant. This finding suggests that disclosure of alcohol content
59 reflecting positive aspects of alcohol might have a self-enhancing effect on the sharers'
60 further alcohol consumption, or that disclosing such content could indicate lenient alcohol-
61 related cognitions not detected by the current measurements.

62

63

64

65

66

67

68

69

70

71

72

73

74

75 **1   Introduction**

76   Alcohol use can cause much harm to the individual user as well as to society (Hingson et al.,
77   2002; Rehm et al., 2003; Rehm et al., 2009). Hence, identifying determinants of alcohol use is
78   of public interest. Previous studies suggest that disclosure of alcohol-related content on social
79   media indicates concurrent alcohol use (Westgate et al., 2014; Geusens and Beullens, 2016),
80   while exposure have in some studies been found to predict later alcohol use (Huang et al.,
81   2014b; Boyle et al., 2016). Social media could thus be an arena for detecting and preventing
82   problematic alcohol use (Moreno et al., 2012; Moreno and Whitehill, 2014; Westgate et al.,
83   2014). The association between disclosure and exposure and alcohol use may depend on type
84   of content shared or seen (van Hoof et al., 2014; Westgate and Holliday, 2016; Groth et al.,
85   2017), but the relationship between different types of alcohol-related content and alcohol use
86   has not been investigated. The causal mechanisms underlying the relationship between
87   alcohol-related disclosure and exposure and alcohol use are not fully understood (D'Angelo et
88   al., 2014; Boyle et al., 2016) although it has been suggested that common factors (e.g.,
89   personality traits) may be at play. It has further been suggested that disclosure and exposure
90   of alcohol-related content may be a mere reflection of alcohol use or that disclosure and
91   exposure may instigate alcohol use (Moreno et al., 2012; Westgate and Holliday, 2016; Groth
92   et al., 2017).

93

94   Certain characteristics seem to increase the likelihood of both disclosure and exposure of
95   alcohol-related content on social media and high alcohol consumption (Westgate and
96   Holliday, 2016). Status as single and extroversion are both positively associated with
97   disclosure of alcohol-related content (Erevik et al., In press) and alcohol consumption
98   (Merenakk et al., 2003; Andersson et al., 2007; Raynor and Levine, 2009). Certain aspects of
99   social media use, like the number of online-friends, seem also to be positively associated with
100 disclosure and exposure and alcohol use (Egan and Moreno, 2011; Ridout et al., 2012;
101 Beullens and Schepers, 2013; Moreno et al., 2014; Westgate et al., 2014; Westgate and
102 Holliday, 2016). Associations between different aspects of social media use and alcohol use
103 are, however, not consistently found (Hoffman et al., 2014; Huang et al., 2014b). Although
104 studies on the relationship between alcohol disclosure and exposure on social media and
105 alcohol use have controlled for factors such as gender, age, and number of online-friends
106 (Glassman, 2012; Ridout et al., 2012), no previous study, thus far, has controlled for the wider
107 range of demographic, personality, and social media factors that may influence this
108 relationship.

109

110 Disclosure of alcohol-related content may be a direct reflection of the sharer's alcohol use
111 (D'Angelo et al., 2014; Westgate et al., 2014; Geusens and Beullens, 2016). Disclosures could
112 also be a reflection of alcohol-related social cognitions (i.e., perceived norms and attitudes),
113 which are known to predict alcohol use (D'Angelo et al., 2014; Westgate et al., 2014).
114 Moreover, exposure to alcohol-related content could be associated with alcohol-related social
115 cognitions as well (Miller et al., 2014). Individuals with high alcohol intake and positive
116 attitudes towards alcohol may be more attentive to alcohol-related content on social media,
117 and hence more frequently exposed to such content as studies have shown stronger attention
118 bias towards alcohol among heavy social drinkers than light social drinkers (Field et al.,
119 2004). Frequent exposure to alcohol-related content may also indicate high alcohol intake in
120 the individual's social network (Huang et al., 2014a), and peers' alcohol use is commonly
121 known as a strong predictor of own alcohol use (Scholte et al., 2008). According to this line

122 of reasoning, some studies have indicated that controlling for alcohol-related cognitions (i.e.,
123 normative apprehensions and attitudes) and/or alcohol use could weaken or eliminate the
124 association between disclosure and exposure to alcohol-related content and future alcohol use
125 (Huang et al., 2014a; Huang et al., 2014b; Boyle et al., 2016).

126

127 Disclosure and exposure of alcohol-related content on social media have also been suggested
128 to cause an increase in alcohol use (Huang et al., 2014b; Boyle et al., 2016; Groth et al.,
129 2017). Disclosing content on social media could lead to a stronger commitment to continue to
130 act in accordance with the attitudes and behaviors that were displayed in order to maintain a
131 coherent self-image (Bem, 1972; D'Angelo et al., 2014). Receiving positive feedback (e.g.,
132 "likes") on alcohol-related posts have been suggested to further enhance drinking through
133 positive reinforcement mechanisms (Skinner, 1953; D'Angelo et al., 2014; Groth et al., 2017).
134 Exposure to alcohol-related content has also been suggested to have direct causal effects on
135 alcohol use (Litt and Stock, 2011; Fournier et al., 2013; Westgate and Holliday, 2016)
136 through mechanisms such as mere exposure effects (Osberg et al., 2012), and indirectly
137 through altering attitudes and perceived norms for alcohol use (Litt and Stock, 2011; Fournier
138 et al., 2013; Boyle et al., 2016). The latter claim is supported by experimental studies showing
139 that exposure to alcohol-related content on social media strengthened the receivers'
140 perception of drinking norms among peers (Litt and Stock, 2011; Fournier et al., 2013).

141

142 Previous studies have linked disclosure and exposure to alcohol use, but few of these studies
143 have been based on longitudinal or experimental designs (Boyle et al., 2016). The
144 directionality between disclosure and exposure and alcohol use is therefore unclear. The
145 current study sought to examine the longitudinal relationship between disclosure and exposure
146 of different types of alcohol-related content on social media and later alcohol use, and to
147 identify covariates that may explain these relationships.

148

149 **2   Material and Methods**

150 **2.1 Procedures and sample**

151 All students registered at the four largest institutions of higher education in Bergen
152 municipality, Norway, were during fall 2015 invited (via e-mails) to participate in an online
153 survey. A total of 11,236 (39.4%) agreed to participate. Participants from the first wave were
154 invited to participate in a follow-up online survey during fall 2016. A total of 5,217 (51.5%)
155 agreed to participate in the follow-up survey. The majority of the former participants were
156 contacted by their student e-mails, while some were contacted by their private e-mails.
157 Approximately 40% of the students ended their education between the first (Time 1, T1) and
158 the second (Time 2, T2) wave of the survey of some reason (e.g. completion of academic
159 degree), according to the institutions from which the sample is recruited. Based on the
160 assumption that 25% of the former participants which were contacted by their student e-mail
161 did not receive the invitation to participate in the follow-up survey, we estimated that about
162 61.2% of the ones who received an invitation agreed to participation. A rate of approximately
163 40% ending their education yearly may be a somewhat high rate in an international
164 perspective. This might be related to the wide availability of higher education in Norway (i.e.
165 due to loans/grants and the absence of tuitions) which may cause Norwegian students more
166 likely to quit their education before completing a degree, as quitting will be less associated
167 with financial loss compared to the cause in many other countries. The study protocol was

168 approved by the Regional Committee for Medical and Health Related Ethics, Western
169 Norway (no. 2015/1154), and the Norwegian Data Protection Authority (no. 49365).

170

2.2 Measurement

171

2.2.1 Demographics

172

173 Demographic variables were measured by questions about birth year, sex, place of birth, and
174 religious identification at the first wave (2014). The participants were asked about relationship
175 status, and parental status in both waves. At T1 the participants were asked "Have you
176 changed educational institution the last year?" (yes; no; I'm no longer a student).

177

2.2.2 Personality

178

179 At T1 the five factor model's personality traits (i.e., extroversion, agreeableness,
180 conscientiousness, neuroticism, and intellect/imagination) were assessed by Mini-
181 International Personality Item Pool (Mini-IPIP) (McCrae and John, 1992; Donnellan et al.,
182 2006). The Mini-IPIP consists of 20 items (i.e. 4 items for each trait), where the respondents
183 are asked to rate the degree specific statements regarding behavior are typical for them.
184 Response alternatives range from "very wrong" (1) to "very right" (5), some items are
185 reversed. Total scores range between 5 and 20 for each trait, where higher scores indicate
186 higher levels of the personality trait in question. The internal reliability of the measurements
187 in the current study was acceptable. The items measuring extroversion, agreeableness,
188 conscientiousness, neuroticism and openness had Cronbach's alphas of .83, .77, .69, .75 and
189 .74, respectively. Self-monitoring (i.e., attentiveness and adaptability to situational norms)
190 was measured by the revised Self-Monitoring Scale, comprising 13 statements (e.g., "In social
191 situations, I have the ability to alter my behavior if I feel that something else is called for") in
192 which respondents are asked to rate the applicability of the statements to own behavior
193 (Snyder, 1974; Lennox and Wolfe, 1984). Response alternatives range from "certainly always
194 false" (0) to "certainly always true" (5), some items are reversed. Composite scores range
195 between 0 and 65, where higher scores indicate higher levels of self-monitoring. The internal
196 reliability of the revised Self-Monitoring Scale was acceptable in the current study, with a
197 Cronbach's alpha of .82.

198

2.2.3 Social media use

199

200 In the first wave participants were asked several questions regarding social media use; if they
201 had an account on a social media site, which sites they used (closed-ended response
202 alternatives of different sites/apps), number of online-friends, and frequency of logins to
203 social media (Karl et al., 2010). Disclosure and exposure of alcohol-related content on social
204 media were assessed by the following questions: "How often do you post content on social
205 media that": a) "Refers to positive consequences of alcohol use (e.g., increased pleasure,
206 social cohesion, relaxation)?", and b) "Refers to negative consequences of alcohol use (e.g.,
207 hangovers, loss of control, hangover anxiety)?" (never; I`ve done it before, but not lately; less
208 than once a month; every month; a couple of times a month; every week; a couple of times a
209 week; daily or almost daily). Similar questions were asked regarding the frequency of
210 exposure to alcohol-related content. The participants were asked to think only of alcohol-
211 related content that were visible to more than two persons. For the questions regarding

212 exposure to alcohol-related content, the participants were instructed to think only of posts etc.
213 from online-friends or individuals they follow on social media.

214

215 **2.2.4 Alcohol use and alcohol-related cognitions**

216 Alcohol use was assessed at T1 and T2 by the Alcohol Use Disorders Identification Test
217 (AUDIT), comprising 10 items (Bohn et al., 1995; Babor et al., 2001). The respondents are
218 asked to assess their own alcohol use the past year and indicate how often they consume
219 alcohol, how many alcohol units they drink on a typical drinking occasion, how often they
220 drink more than six alcohol units, and how often they experience different adverse
221 consequences related to their alcohol use (e.g. problems controlling consumption, feelings of
222 guilt). The response alternatives vary somewhat, but answers to the different items are given a
223 value between 0 and 4. Total scores on AUDIT range from 0-40, where higher scores indicate
224 higher alcohol consumption and more frequent occurrence of alcohol-related harm. Scores
225 over 7 are considered to indicate risky drinking (Bohn et al., 1995; Babor et al., 2001). The
226 Cronbach's alpha for AUDIT at T1 and T2 was .78 and .79, respectively. The measurement of
227 alcohol use at T1 had a strong correlation to the measurements at T2, with a Pearson
228 correlation of .80. Descriptive norms for alcohol use and the participants' prototypic
229 apprehension of the typical heavy drinker and the typical sharer of alcohol-related content on
230 social media were assessed at T1. Prototypic apprehensions were measured by the following
231 questions: a) "What is your overall impression of the typical student that drinks 6 alcohol
232 units or more on a regular drinking night?", and b) "What is your overall impression of the
233 typical student posting alcohol-related content on social media?" Response alternatives
234 ranged from one (extremely negative) to ten (extremely positive) (Todd and Mullan, 2011).
235 Descriptive norms were assessed by the questions: "Think about the five students you know
236 best. How many of them do you think drink": a) "alcohol a couple of times a week?", b) "10
237 alcohol units or more on a typical drinking occasion?", and c) "6 alcohol units or more (on the
238 same occasion) a couple of times a week?" (Response range: 0-5 students) (Bohn et al., 1995;
239 Babor et al., 2001; Tickle et al., 2006; Miller et al., 2014). Similar questions were asked to
240 assess descriptive norms for drinking among online-friends, but for these questions the
241 participants were asked to think about the 5 individuals of which they see most posts from on
242 social media. The answers to the three questions regarding descriptive norms for alcohol use
243 among co-students and among online-friends were summarized. Total scores on descriptive
244 norms for alcohol use among co-students and online-friends thus ranged between 0 and 15,
245 respectively. In the current study the Cronbach's alpha for descriptive norms for alcohol use
246 among co-students was .69 and the Cronbach's alpha for descriptive norms for alcohol use
247 among online-friends was .72.

248

249 **2.3 Analysis**

250 Data analyses were conducted with IBM SPSS Statistics 23, R, and Mplus 7. Missing data
251 were deleted listwise. Descriptive analyses were conducted to identify the sample's central
252 tendencies on the study variables. To check for dropout bias, the current sample (i.e.,
253 participated at both T1 and T2) was compared to the participants that only participated at T1
254 on a range of variables by the use of independent sample t-tests and chi-square tests. Cohen's
255 *d* or phi coefficients were calculated as an indicator of effect-sizes. By conventional standards
256 Cohen's *d*s of .20, .50, and .80 represent small, moderate, and large effect sizes, respectively
257 (Cohen, 1988). For phi coefficients, .10, .30, and .50 represent small, moderate, and large
258 effect sizes, respectively (Cohen, 1988). Significance tests of difference were conducted for

259   both the independent sample t-tests and the chi-square comparisons. Further, we conducted
260   equivalence tests for the independent sample t-tests and chi-square tests. Equivalence tests of
261   group difference are based on the assumption that Cohen's ds or correlations which are
262   significantly smaller than a given value indicate the absence of any practical meaningful
263   differences (Lakens, 2017). In the current study effect size cut-offs were based on power
264   analyses with 90% power.

265

266   Alcohol use (i.e., baseline and later) among those participants who reported to frequently
267   disclose or frequently were exposed to alcohol-related content referring to positive and
268   negative aspects of alcohol were compared to the alcohol use of those who reported low-
269   frequent disclosure or exposure. Baseline alcohol use refers to the participants AUDIT-scores
270   at T1, and later alcohol use refers to AUDIT-scores at T2. Frequent disclosure/exposure was
271   defined as reporting disclosure/exposure monthly or more often.

272

273   Crude, partly adjusted, and fully adjusted linear regressions were conducted to investigate the
274   association between disclosure and exposure of alcohol-related content and later alcohol use
275   and changes in alcohol use. Covariates were controlled for (one block at a time) to investigate
276   which factors could explain the relationship between disclosure and exposure and later
277   alcohol use. The dependent variable was AUDIT-score at T2 and change in AUDIT-score
278   (AUDIT T2 minus AUDIT T1). The four main independent variables of interest in the current
279   study were: i) frequency of disclosure of alcohol-related content depicting positive aspects of
280   alcohol, ii) frequency of disclosure of alcohol-related content depicting negative aspects of
281   alcohol use, iii) frequency of exposure to alcohol-related content depicting positive aspects of
282   alcohol, and iv) frequency to exposure of alcohol-related content depicting negative aspects of
283   alcohol use. The disclosure/exposure variables were dichotomized into frequent (i.e., monthly
284   or more often) disclosure/exposure vs. low-frequent disclosure/exposure. The first regression-
285   models were crude, where no covariates were controlled for. The second models were
286   adjusted for demographics and personality factors (i.e., age, sex, place of birth, religious
287   identification, changes in relationship and parental status, changes in student status,
288   extroversion, agreeableness, conscientiousness, neuroticism, intellect/imagination, and self-
289   monitoring). The third models were adjusted for other aspects of social media use (i.e.,
290   frequency of logins to social media, number of online-friends, having a Snapchat account, and
291   disclosure/exposure of alcohol-related content reflecting positive or negative aspects of
292   alcohol). The fourth models were adjusted for T1 alcohol use (AUDIT-score). The fifth
293   models were adjusted alcohol-related cognitions (i.e., prototypic apprehension of the typical
294   heavy drinker and of the typical sharer of alcohol-related content, descriptive norms for
295   alcohol use among co-students and online-friends). Finally, fully adjusted regressions models
296   were run. All the independent variables, with the exception of changes in relationship-,
297   childcare-, or student status between the first and the second wave, were based on
298   measurements from the first wave. Completely standardized betas are reported for the
299   different regression models as an indicator of effect size; completely standardized betas of
300   .10, .30, and .50 represent small, moderate, and large effect sizes, respectively (Cohen, 1988).

301

302   **3   Results**

303   Table 1 illustrates the sample's characteristics, and a dropout analysis comparing the sample
304   to the participants that only partook at T1. The sample's mean age at T2 was 25.8 years,

305 64.8% were women, 92.7% were born in Norway, and 83.7% were still students at T2. There
306 were only few significant differences between the sample in the present study (those that
307 participated both at T1 and T2), and those that only participated at T1. Equivalence could not
308 be established for all variables which were included in the dropout analysis. The effect sizes
309 regarding the differences between the group that participated at both T1 and T2 and the group
310 that only participated at T1 were, however, within the range of what is considered as very
311 small. The sample had a mean reduction in AUDIT-score of 0.6 from T1 to T2.

312

313 The frequent disclosure and exposure groups' alcohol use compared to the low frequent
314 disclosure and exposure groups' use are shown in Table 2 and Table 3. The frequent
315 disclosure/exposure groups had significantly higher AUDIT-scores at T1 (p < .001) and T2 (p
316 < .001) compared to the respective low-frequent disclosure/exposure groups. The frequent
317 disclosure and exposure groups had a higher distribution of risky drinking (AUDIT≥8) at T1
318 (p < .001) and T2 (p < .001), compared to the low-frequent disclosure and exposure groups.
319 Disclosing alcohol-related content at T1 was particularly indicative of risky drinking both at
320 T1 and T2.

321

322 **3.1 Disclosure and exposure and alcohol use when controlling for covariates**

323 The relationship between frequent disclosure and exposure and later alcohol use, when
324 controlling for different covariates, are shown in Table 4. Controlling for demographic and
325 personality factors reduced the strength of the relationship between frequent disclosure and
326 exposure and later alcohol use, but the reduction was small compared to the reduction seen
327 when the other covariates were controlled for. The association between frequent disclosure
328 and exposure was further reduced when other aspects of social media use was controlled for.
329 Controlling for baseline alcohol use involved the largest weakening of the association
330 between all types of disclosure and exposure and later alcohol use. The association between
331 frequent disclosure and exposure of content referring to positive aspects of alcohol and later
332 alcohol use were, however, still significant even when baseline alcohol use was controlled for.
333 Controlling for alcohol-related cognitions resulted in a weakening of the association between
334 frequent disclosure and exposure and later alcohol use as well. Only the association between
335 frequent disclosure of content referring to positive aspects of alcohol and later alcohol use
336 remained significant when all covariates were controlled for.

337

338 Participants which frequently disclosed content referring to negative aspects of alcohol or
339 were frequently exposed to content referring to positive or negative aspects of alcohol had a
340 significant reduction in their AUDIT-scores from T1 to T2, compared to the respective low-
341 frequent disclosure and exposure groups. This reduction was eliminated when baseline
342 alcohol use was controlled for. Participants who reported frequent disclosure of content
343 referring to positive aspects of alcohol experienced an increase in later alcohol use, compared
344 to the participants that reported low-frequent disclosure of such content.

345

346 Regression models with large sample sizes and single items measurements could involve an
347 increased risk of conducting type I errors (Westfall and Yarkoni, 2016). The regression
348 models were subsequently conducted using structural equation models to ensure that the
349 results found in the regression models were robust. Alcohol use at T1, the five factor model's

350 personality traits, self-monitoring, descriptive norms for alcohol use among co-students and
351 among online-friends, and alcohol use at T2 were latent variables in the structural equation
352 models. These models (results not shown) yielded similar results as the reported regression
353 models.

354

355 **4   Discussion**

356 Our findings suggest that frequent disclosure and exposure to alcohol-related content on
357 social media is positively associated with both baseline and later alcohol use. This supports
358 the notion that social media can be a suitable arena for detecting problematic alcohol usage. In
359 particular, disclosure of alcohol-related content was related to high alcohol use, which is in
360 line with previous research (Miller et al., 2014; Westgate et al., 2014). It should be noted that
361 the whole sample demonstrated a reduction in alcohol use over time. The frequent disclosure
362 and exposure-groups had higher alcohol consumption compared to the low-frequent
363 disclosure and exposure groups. Some of the disclosure and exposure-groups did, however,
364 also have a larger reduction in alcohol use (when no covariates were controlled for),
365 compared to the respective low-frequent disclosure and exposure groups. We speculate that
366 the larger reduction in alcohol use observed among some of the disclosure and exposure-
367 groups could be explained by their initial high alcohol use, as individuals tend to regress
368 toward group means over time (Bland and Altman, 1994). In line with this, the disclosure and
369 exposure-groups relative reduction in alcohol use disappeared when baseline alcohol use was
370 controlled for. Frequent disclosure of content referring to positive aspects of alcohol use was
371 associated with stable or slightly increasing alcohol use over time (when all covariates were
372 controlled for), compared to the reduction in alcohol use found among participants with low-
373 frequent disclosure of such content.

374

375 The relationship between disclosure and exposure and baseline and later alcohol use differed
376 based on the type of alcohol-related content shared or seen. Disclosure of content referring to
377 negative aspects of alcohol use was a stronger indicator of alcohol use than disclosure of
378 content referring to positive aspects of alcohol use, when no covariates were controlled for.
379 The experience of adverse effects is considered to be an important indicator of problematic
380 alcohol use (Babor et al., 2001). Accordingly, disclosing content related to negative aspects of
381 alcohol may serve as a measure of problematic alcohol usage. However, disclosing content
382 referring to positive aspects of alcohol use were identified as a stronger indicator of later
383 alcohol use when the different covariates were controlled for, which may suggest that
384 disclosure of such content predicts stabile or increasing alcohol use when other factors (e.g.
385 demographics) are hold constant. In addition, exposure to alcohol indicated later alcohol use;
386 here the relationship was strongest for content reflecting positive aspects of alcohol use.
387 However, the relationship between exposure and later alcohol use was not significant when all
388 covariates were controlled for.

389

390 **4.1 Common factors did not explain the relationship between disclosure and exposure**
391 **and later alcohol use**

392 The association between disclosure and exposure and later alcohol use was mitigated when
393 controlling for demographics and personality factors, and for other aspects of social media
394 use. Disclosure and exposure have been or may be linked to certain demographic, personality,
395 and social media use factors (e.g., being single, extroversion, strong social media

396 engagement) which again have been linked to increased alcohol use (Merenakk et al., 2003;
397 Andersson et al., 2007; Egan and Moreno, 2011; Beullens and Schepers, 2013; Westgate et
398 al., 2014; Erevik et al., 2017). The current results nevertheless suggest that the relationship
399 between disclosure and exposure and later alcohol use cannot be fully attributed to such
400 confounding factors.

401

402 **4.2 Disclosure and exposure was strongly associated with baseline alcohol use and**
403 **alcohol-related cognitions**

404 The association between disclosure and exposure and later alcohol use was substantially
405 reduced when adjusting for alcohol use at baseline. Few studies have controlled for baseline
406 alcohol use, but the current findings (i.e., small or no effect of exposure on later alcohol use)
407 are similar to the findings from comparable studies (Huang et al., 2014a; Huang et al., 2014b;
408 Boyle et al., 2016). Disclosure as an indicator of later alcohol use has not been investigated
409 longitudinal before, while controlling for baseline alcohol use. The current findings suggest
410 that disclosure and exposure primarily reflects baseline alcohol use, that high alcohol use
411 predicts both disclosure and exposure to alcohol as well as further alcohol use. On the other
412 hand, it should be noted that the measurements in the current study were separated by one
413 year. It is possible that the temporal relationships between disclosure and exposure and later
414 alcohol use are either too short-lived or take longer time to become established than the one-
415 year follow-up time used in present study. In addition, the strong correlation between alcohol
416 use at T1 and T2 and the clear association between alcohol disclosure/exposure on social
417 media and high alcohol use, suggest that these behaviors might be intertwined and
418 reciprocally reinforcing. Thus, the issue of directionality seems hard to determine with the
419 current design. Individuals with high alcohol use may display and be exposed to more alcohol
420 use in both online and offline settings and continue to have a high alcohol use over time.
421 Hence, the potential separate effects of online alcohol disclosure/exposure on further alcohol
422 use might be hard to detect. The current results nonetheless suggest that alcohol
423 disclosure/exposure's potential effects on further alcohol are likely to be small in populations
424 were alcohol habits are pre-established, e.g. college/university student populations. Adjusting
425 for baseline norm perceptions and attitudes also resulted in a weakening of the association
426 between disclosure and exposure and later alcohol use. The current finding suggest as such
427 that the association between alcohol disclosure/exposure on social media and later alcohol
428 use, could in part be explained by an association between disclosure/exposure and lenient
429 alcohol-related cognitions (Westgate et al., 2014).

430

431 **4.3 Disclosing positive alcohol content may influence later alcohol use**

432 Frequent disclosure of content reflecting positive aspects of alcohol use was the only
433 independent variable that predicted later alcohol use, when all covariates were controlled for.
434 Disclosure of content related to positive aspects of alcohol use may reflect attitudes or
435 experiences regarding alcohol use not measured in the current study. Disclosure of positive
436 alcohol-related content could suggest that the individuals have positive attitudes towards
437 alcohol or alcohol-related cognitions, which were not detected by the alcohol-related
438 cognitions questions included in the present study (D'Angelo et al., 2014; Westgate et al.,
439 2014). Disclosures of alcohol-related content referring to positive aspects of alcohol could
440 also indicate that the individual is experiencing pleasurable effects of alcohol. Positive
441 alcohol-related cognitions and the experience of positive consequences are further considered

442 as important motivational determinants of further alcohol use (Park, 2004; Zimmermann and
443 Sieverding, 2010; Lee et al., 2011).

444

445 Disclosing content related to positive aspects of alcohol might, however, also represent a
446 causal influence on later alcohol use. Posting alcohol-related content referring to positive
447 aspects of alcohol use may make the senders' attitudes towards alcohol more positive, through
448 mechanisms such as self-identification with own postings, potential self-fulfilling prophecies
449 and cognitive dissonance (Merton, 1948; Festinger, 1962; Bem, 1972; D'Angelo et al., 2014).
450 Disclosures of positive alcohol-related content may also cause a later increase in alcohol use
451 through likes and other types of virtual appraisals acting as positive reinforces (Skinner, 1953;
452 D'Angelo et al., 2014; Groth et al., 2017). A previous study found disclosure of content
453 referring to positive aspects of alcohol to yield more likes than disclosure of content referring
454 to negative aspects of alcohol (Beullens and Schepers, 2013). The increased number of likes
455 associated with alcohol-related content reflecting positive aspects of alcohol may explain why
456 disclosure of this type of content predicted later alcohol use, even when all covariates were
457 adjusted for.

458

459 **4.4 Limitations and strengths**

460 The present study is not without limitations. The measurements are based on self-report, and
461 responses to self-report questions may be affected by social desirability and recall biases
462 (Raphael, 1987; Gnambs and Kaspar, 2015). Another limitation with the current study is that
463 some concepts were measured by single-items (e.g. prototypic evaluations, specific type of
464 alcohol disclosure/exposure), which could make the results more likely to be affected by
465 measurements errors (Nunnally, 1978). In addition, some variables that may explain the
466 relationship between disclosure/exposure and alcohol use (e.g. parents' alcohol use) were not
467 included in the study. Finally, the study's sample consisted of Norwegian students, which
468 may limit the generalizability of the current findings. A major strength with the present study
469 is the longitudinal design, and the study can hence give an indication of directionality and
470 causality (Rutter, 1988). The high correlation between alcohol use at T1 and T2, and the
471 strong association between concurrent alcohol use and alcohol disclosure/exposure do,
472 however, hamper conclusions regarding directionality. Further, it is important to note that
473 causality cannot be established (only indicated) by the current research design (Cohen et al.,
474 2013). The study provides new knowledge regarding the relationship between different types
475 of alcohol-related content and later alcohol use, and the importance of different covariates in
476 this relationship. The comprehensive set of covariates included and controlled for, and the
477 large sample size are further strengths of the present study, which clearly distinguishes the
478 current study from any previous studies in the research field.

479

480 **5   Conclusions**

481 Frequent disclosure and/or exposure to alcohol-related content indicate consecutive high
482 alcohol intake. The association between disclosure/exposure and subsequent alcohol use was
483 considerably weakened when baseline alcohol use was adjusted for. This finding might
484 suggest that disclosure/exposure primarily reflects baseline alcohol use. Alcohol
485 disclosure/exposure on social media and high alcohol use might, however, be intertwined and
486 reciprocally reinforcing behaviors making the separate effects of online alcohol
487 disclosure/exposure on further alcohol use hard to detect. More research and experimental

studies are required to make final conclusions regarding directionality and causality in the relationship between alcohol disclosure/exposure on social media and alcohol use. Disclosing content reflecting positive aspects of alcohol may have a self-enhancing effect on the sharers' alcohol use and can predict stable or slightly increasing alcohol consumption over time when other factors (e.g. baseline alcohol use) are hold constant. The relationship between disclosure of content referring to positive aspects of alcohol and later alcohol use may, however, also be explained by potential third variables not included in the current study, e.g. positive alcohol experiences.

6   Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

7   Funding

8   Author contributions

Conceived and designed the research: SP, EKE, TT, CSA. Preformed the research: EKE, SP, TT. Analyzed the data: EKE, TT, ØV, SP. Contributed to the writing of the manuscript: EKE, SP, CSA, ØV, TT.

9   Acknowledgements

10   References

Andersson, C., Johnsson, K.O., Berglund, M., and Ojehagen, A. (2007). Alcohol involvement in Swedish university freshmen related to gender, age, serious relationship and family history of alcohol problems. *Alcohol and Alcoholism* 42, 448-455. doi: 10.1093/alcalc/agm008

Babor, T.F., Higgins-Biddle, J.C., Saunders, J.B., and Monteiro, M.G. (2001). "The alcohol use disorders identification test: Guidelines for use in primary care". (www.who.int: World Health Organization).

Bem, D.J. (1972). Self-Perception Theory. *Advances in Experimental Social Psychology* 6, 1-62. doi: 10.1016/S0065-2601(08)60024-6

Beullens, K., and Schepers, A. (2013). Display of alcohol use on Facebook: A content analysis. *Cyberpsychology, Behavior, and Social Networking* 16, 497-503. doi: 10.1089/cyber.2013.0044

528 Bland, J.M., and Altman, D.G. (1994). Statistics notes: some examples of regression towards
529   the mean. *Bmj* 309**,** 780. doi: 10.1136/bmj.309.6957.780
530 Bohn, M.J., Babor, T.F., and Kranzler, H.R. (1995). The Alcohol Use Disorders Identification
531   Test (AUDIT): validation of a screening instrument for use in medical settings.
532   *Journal of studies on alcohol* 56**,** 423-432. doi: 10.15288/jsa.1995.56.423
533 Boyle, S.C., Labrie, J.W., Froidevaux, N.M., and Witkovic, Y.D. (2016). Different digital
534   paths to the keg? How exposure to peers' alcohol-related social media content
535   influences drinking among male and female first-year college students. *Addictive*
536   *behaviors* 57**,** 21-29. doi: 10.1016/j.addbeh.2016.01.011
537 Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* NJ: Erlbaum:
538   Hillsdale.
539 Cohen, J., Cohen, P., West, S.G., and Aiken, L.S. (2013). *Applied multiple*
540   *regression/correlation analysis for the behavioral sciences.* NJ: Erlbaum.
541 D'angelo, J., Kerr, B., and Moreno, M.A. (2014). Facebook displays as predictors of binge
542   drinking: From the virtual to the visceral. *Bulletin of science, technology & society* 34**,**
543   159-169. doi: 10.1177/0270467615584044
544 Donnellan, M.B., Oswald, F.L., Baird, B.M., and Lucas, R.E. (2006). The Mini-IPIP scales:
545   Tiny-yet-effective measures of the big five factors of personality. *Psychological*
546   *Assessment* 18**,** 192-203. doi: 10.1037/1040-3590.18.2.192
547 Egan, K.G., and Moreno, M.A. (2011). Alcohol references on undergraduate males' Facebook
548   profiles. *American Journal of Men's Health* 5**,** 413-420. doi:
549   10.1177/1557988310394341
550 Erevik, E.K., Torsheim, T., Vedaa, Ø., Andreassen, C.S., and Pallesen, S. (2017). Sharing of
551   alcohol-related content on social networking sites: Frequency, content and correlates.
552   *Journal of Studies on Alcohol and Drugs* 78, 608-616. doi: 10.15288/jsad.2017.78.608
553 Festinger, L. (1962). *A theory of cognitive dissonance.* Stanford university press.
554 Field, M., Mogg, K., Zetteler, J., and Bradley, B.P. (2004). Attentional biases for alcohol cues
555   in heavy and light social drinkers: the roles of initial orienting and maintained
556   attention. *Psychopharmacology* 176**,** 88-93. doi: 10.1007/s00213-004-1855-1
557 Fournier, A.K., Hall, E., Ricke, P., and Storey, B. (2013). Alcohol and the social network:
558   Online social networking sites and college students' perceived drinking norms.
559   *Psychology of Popular Media Culture* 2**,** 86-95. doi: 10.1037/a0032097
560 Geusens, F., and Beullens, K. (2016). Strategic Self-Presentation or Authentic
561   Communication? Predicting Adolescents' Alcohol References on Social Media.
562   *Journal of Studies on Alcohol and Drugs* 78**,** 124-133. doi: 10.15288/jsad.2017.78.124
563 Glassman, T. (2012). Implications for College Students Posting Pictures of Themselves
564   Drinking Alcohol on Facebook. *Journal of Alcohol and Drug Education* 56**,** 1. 38-58.
565 Gnambs, T., and Kaspar, K. (2015). Disclosure of sensitive behaviors across self-administered
566   survey modes: a meta-analysis. *Behavior Research Methods* 47**,** 1237-1259. doi:
567   10.3758/s13428-014-0533-4
568 Groth, G.G., Longo, L.M., and Martin, J.L. (2017). Social media and college student risk
569   behaviors: A mini-review. *Addictive Behaviors* 65**,** 87-91. doi:
570   10.1016/j.addbeh.2016.10.003
571 Hingson, R.W., Heeren, T., Zakocs, R.C., Kopstein, A., and Wechsler, H. (2002). Magnitude
572   of alcohol-related mortality and morbidity among US college students ages 18-24.
573   *Journal of studies on alcohol* 63**,** 136-144. doi: 10.15288/jsa.2002.63.136
574 Hoffman, E.W., Pinkleton, B.E., Austin, E.W., and Reyes-Velàzquez, W. (2014). Exploring
575   college students' use of general and alcohol-related social media and their associations
576   with alcohol-related behaviors. *Journal of American College Health* 62**,** 328-335. doi:
577   10.1080/07448481.2014.902837

Huang, G.C., Soto, D., Fujimoto, K., and Valente, T.W. (2014a). The Interplay of Friendship Networks and Social Networking Sites: Longitudinal Analysis of Selection and Influence Effects on Adolescent Smoking and Alcohol Use. *American Journal of Public Health* 104**,** e51-e59. doi: 10.2105/AJPH.2014.302038

Huang, G.C., Unger, J.B., Soto, D., Fujimoto, K., Pentz, M.A., Jordan-Marsh, M., and Valente, T.W. (2014b). Peer influences: The impact of online and offline friendship networks on adolescent smoking and alcohol Use. *Journal of Adolescent Health* 54**,** 508-514. doi: 10.3758/s13428-014-0533-410.1016/j.jadohealth.2013.07.001

Karl, K., Peluchette, J., and Schlaegel, C. (2010). Who's posting Facebook faux pas? A cross-cultural examination of personality differences. *International Journal of Selection and Assessment* 18**,** 174-186. doi: 10.3758/s13428-014-0533-410.1111/j.1468-2389.2010.00499.x

Lakens, D. (2017) Equivalence tests: A practical primer for t tests, correlations, and meta-analyses. *Social Psychological and Personality Science* 8, 355-362. doi: 10.1177/1948550617697177

Lee, C.M., Maggs, J.L., Neighbors, C., and Patrick, M.E. (2011). Positive and negative alcohol-related consequences: Associations with past drinking. *Journal of Adolescence* 34**,** 87-94. doi: 10.1016/j.adolescence.2010.01.009

Lennox, R.D., and Wolfe, R.N. (1984). Revision of the self-monitoring scale. *Journal of Personality and Social Psychology* 46**,** 1349-1364. doi: 10.3758/s13428-014-0533-410.1037/0022-3514.46.6.1349

Litt, D.M., and Stock, M.L. (2011). Adolescent alcohol-related risk cognitions: The roles of social norms and social networking sites. *Psychology of Addictive Behaviors* 25**,** 708-713. doi: 10.3758/s13428-014-0533-410.1037/a0024226

Mccrae, R.R., and John, O.P. (1992). An introduction to the 5-factor model and its applications. *Journal of Personality* 60**,** 175-215. doi: 10.1111/j.1467-6494.1992.tb00970.x

Merenakk, L., Harro, M., Kiive, E., Laidra, K., Eensoo, D., Allik, J., Oreland, L., and Harro, J. (2003). Association between substance use, personality traits, and platelet MAO activity in preadolescents and adolescents. *Addictive Behaviors* 28**,** 1507-1514. doi: 10.1016/s0306-4603(02)00270-8

Merton, R.K. (1948). The self-fulfilling prophecy. *The Antioch Review* 8**,** 193-210. doi: 10.2307/4609267

Miller, J., Prichard, I., Hutchinson, A., and Wilson, C. (2014). The relationship between exposure to alcohol-related content on Facebook and predictors of alcohol consumption among female emerging adults. *Cyberpsychology Behavior and Social Networking* 17**,** 735-741. doi: 10.3758/s13428-014-0533-410.1089/cyber.2014.0337

Moreno, M.A., Christakis, D.A., Egan, K.G., Brockman, L.N., and Becker, T. (2012). Associations between displayed alcohol references on Facebook and problem drinking among college students. *Archives Of Pediatrics & Adolescent Medicine* 166**,** 157-163. doi: 10.1001/archpediatrics.2011.180

Moreno, M.A., D'angelo, J., Kacvinsky, L.E., Kerr, B., Zhang, C., and Eickhoff, J. (2014). Emergence and predictors of alcohol reference displays on Facebook during the first year of college. *Computers in Human Behavior* 30**,** 87-94. doi: 10.3758/s13428-014-0533-410.1016/j.chb.2013.07.060

Moreno, M.A., and Whitehill, J.M. (2014). Influence of Social Media on Alcohol Use in Adolescents and Young Adults. *Alcohol Research* 36**,** 91-100.

Nedregård, T., and Olsen, R. 2014. Studentenes helse- og trivselsundersøkelse 2014. [Students' Health and Wellbeing Survey 2014]. Available: : http://www.google.no/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=

0CB0QFjAA&url=http%3A%2F%2Fwww.vtbergen.no%2Fwp-
content%2Fuploads%2F2013%2F10%2FVT0614_6214_SHoT2014.pdf&ei=w21HVZ
vGEIOvswG8woGQDw&usg=AFQjCNESqBK5IcWkVZUNzMxPA7ANwM2HzA&
sig2=CahhInSPe7w4ZBNAUWdXiA.

Nunnally, J.C. (1978). *Psychometric theory.* NY: McGraw-Hill.

Osberg, T.M., Billingsley, K., Eggert, M., and Insana, M. (2012). From Animal House to Old
School: A multiple mediation analysis of the association between college drinking
movie exposure and freshman drinking and its consequences. *Addictive behaviors* 37**,**
922-930. doi: 10.1016/j.addbeh.2012.03.030

Park, C.L. (2004). Positive and negative consequences of alcohol consumption in college
students. *Addictive Behaviors* 29**,** 311-321. doi: 10.1016/j.addbeh.2003.08.006

Raphael, K. (1987). Recall bias - A proposal for assesment and control. *International Journal
of Epidemiology* 16**,** 167-170. doi: 10.1093/ije/16.2.167

Raynor, D.A., and Levine, H. (2009). Associations between the five-factor model of
personality and health behaviors among college students. *Journal of American College
Health* 58**,** 73-81. doi: 10.3200/JACH.58.1.73-82

Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., and Patra, J.
(2009). Alcohol and Global Health 1: Global burden of disease and injury and
economic cost attributable to alcohol use and alcohol-use disorders. *Lancet* 373**,** 2223-
2233. doi: 10.1016/S0140-6736(09)60746-7

Rehm, J., Room, R., Graham, K., Monteiro, M., Gmel, G., and Sempos, C.T. (2003). The
relationship of average volume of alcohol consumption and patterns of drinking to
burden of disease: An overview. *Addiction* 98**,** 1209-1228. doi: 10.1046/j.1360-
0443.2003.00467.x

Ridout, B., Campbell, A., and Ellis, L. (2012). 'Off your Face(book)': Alcohol in online
social identity construction and its relation to problem drinking in university students.
Drug and Alcohol Review 31**,** 20-26. doi: 10.1111/j.1465-3362.2010.00277.x

Rutter, M. (1988). "Longitudinal data in the study of causal processes: Some uses and some
pitfalls", in *Studies of psychosocial risk: The power of longitudinal data,* ed. M. Rutter
(Cambridge, UK: Cambridge University Press), 1-28.

Scholte, R.H.J., Poelen, E.a.P., Willemsen, G., Boomsma, D.I., and Engels, R.S.M.E. (2008).
Relative risks of adolescent and young adult alcohol use: The role of drinking fathers,
mothers, siblings, and friends. *Addictive Behaviors* 33**,** 1-14. doi:
10.1016/j.addbeh.2007.04.015

Skinner, B.F. (1953). *Science and human behavior.* New York: Simon and Schuster.

Snyder, M. (1974). Self-monitoring of expressive behavior. *Journal of Personality and Social
Psychology* 30**,** 526-537. doi: 10.1037/h0037039

Tickle, J.J., Hull, J.G., Sargent, J.D., Dalton, M.A., and Heatherton, T.F. (2006). A structural
equation model of social influences and exposure to media smoking on adolescent
smoking. *Basic and Applied Social Psychology* 28**,** 117-129. doi:
10.1207/s15324834basp2802_2

Todd, J., and Mullan, B. (2011). Using the theory of planned behaviour and prototype
willingness model to target binge drinking in female undergraduate university
students. *Addictive Behaviors* 36**,** 980-986. doi: 10.1016/j.addbeh.2011.05.010

Van Hoof, J.J., Bekkers, J., and Van Vuuren, M. (2014). Son, you're smoking on Facebook!
College students' disclosures on social networking sites as indicators of real-life risk
behaviors. *Computers in Human Behavior* 34**,** 249-257. doi:
10.1016/j.chb.2014.02.008

Westfall, J., and Yarkoni, T. (2016) Statistically controlling for confounding constructs is
harder than you think. *PloS one* 11, e0152719. doi: 10.1371/journal.pone.0152719

678 Westgate, E.C., and Holliday, J. (2016). Identity, influence, and intervention: The roles of
679   social media in alcohol use. *Current Opinion in Psychology* 9**,** 27-32. doi:
680   10.1016/j.copsyc.2015.10.014
681 Westgate, E.C., Neighbors, C., Heppner, H., Jahn, S., and Lindgren, K.P. (2014). "I will take
682   a shot for every 'like' I get on this status": Posting alcohol-related Facebook content is
683   linked to drinking outcomes. *Journal of studies on alcohol and drugs* 75**,** 390-398.
684   doi: 10.15288/jsad.2014.75.390
685 Zimmermann, F., and Sieverding, M. (2010). Young adults' social drinking as explained by an
686   augmented theory of planned behaviour: The roles of prototypes, willingness, and
687   gender. *British Journal Of Health Psychology* 15**,** 561-581. doi:
688   10.1348/135910709x476558

689

690

691

692

693

694

Table 1 Sample characteristics and dropout analysis

	Participated only at T1 N = 6,019	Participated at T1 and T2, N = 5,217	Significance test and effect size of differences
	Mean (SD)/ % (95% CI)	Mean (SD) / % (95% CI)	
Demographics			
Age at T2 (i.e., age at T1 + 1 year)	26.0 (6.6)	25.8 (6.3)	Cohen's d = .025$^{E, N.S., 2}$
Women	62.1% (60.8-63.3%)	64.8% (63.5-66.1%)	Phi = .028$^{N.E., **}$
Born in Norway	92.2% (91.5-92.9%)	92.7% (92.0-93.4%)	Phi = .010$^{E, N.S.}$
Single at T1	47.6% (46.3-48.9%)	46.9% (45.6-48.2%)	Phi = .007$^{E, N.S.}$
Parent at T1	11.9% (11.0-12.7%)	11.1% (10.2-11.9%)	Phi = .012$^{E, N.S.}$
Religious at T1	36.0% (34.7-37.2%)	33.4% (32.2-34.7%)	Phi = .026$^{N.E., **}$
Student at T2	-	83.7% (82.7-84.8%)	-
Personality^a			
Extroversion	14.1 (3.6)	14.0 (3.7)	Cohen's d = .029$^{N.E., N.S., 1}$
Agreeableness	16.8 (2.8)	16.9 (2.8)	Cohen's d = .055$^{N.E., **, 2}$
Conscientiousness	14.6 (3.2)	14.7 (3.2)	Cohen's d = .030$^{N.E., N.S., 1}$
Neuroticism	11.1 (3.6)	11.0 (3.7)	Cohen's d = .021$^{E, N.S., 2}$
Intellect/imagination	14.6 (3.2)	14.6 (3.2)	Cohen's d = .001$^{E, N.S., 1}$
Self-monitoring^b			
Self-monitoring score	40.0 (7.7)	40.1 (7.9)	Cohen's d = .012$^{E, N.S., 2}$
Alcohol use^c			
AUDIT-score T1	8.2 (4.9)	8.2 (4.9)	Cohen's d = .013$^{E, N.S., 1}$
AUDIT-score T2	-	7.5 (4.7)	-
Change in AUDIT-score (T2-T1)	-	-0.6 (3.0)	-
Risky drinking (8≤AUDIT, T1)	53.0% (51.7-54.4%)	53.0% (51.6-54.4%)	Phi = .000$^{E, N.S.}$
Risky drinking (8≤AUDIT, T2)	-	47.0% (45.6-48.4%)	-
Alcohol-related cognitions			
Prototypic apprehension of the typical heavy drinker (T1)^d	5.0 (1.4)	5.0 (1.4)	Cohen's d = .030$^{N.E., N.S., 1}$
Number of 5 closest co-students that drinks a couple of times a week (T1)	1.9 (1.5)	1.9 (1.5)	Cohen's d = .004$^{E, N.S., 1}$
Number of 5 closest co-students that typically drink 10 alcohol units or more (T1)	0.8 (1.2)	0.7 (1.2)	Cohen's d = .063$^{N.E., **, 2}$
Number of 5 closest co-students that drink 6 units or more a couple of times a week (T1)	1.0 (1.3)	0.9 (1.3)	Cohen's d = .044$^{N.E., *, 2}$
Prototypic apprehension of the typical sharer of alcohol-related content on social media (T1)^d	4.7 (1.4)	4.7 (1.4)	Cohen's d = .016$^{E, N.S., 1}$
Number of 5 closest online-friends that drinks a couple of times a week (T1)	1.8 (1.4)	1.8 (1.5)	Cohen's d = .012$^{E, N.S., 1}$
Number of 5 closest online-friends that typically drink 10 alcohol units or more (T1)	0.94 (1.3)	0.86 (1.2)	Cohen's d = .064$^{N.E., **, 2}$
Number of 5 closest online-friends that drink 6 units or more a couple of times a week (T1)	1.1 (1.3)	1.0 (1.3)	Cohen's d = .058$^{N.E., **, 2}$
Social media use and alcohol-related disclosure and exposure			
Frequency of login to social media^e	6.6 (1.0)	6.7 (0.9)	Cohen's d = .042$^{N.E., *, 2}$
Number of online-friends	460.0 (272.6)	454.0 (264.3)	Cohen's d = .023$^{E., N.S., 2}$
Have a Snapchat-account	87.6% (86.7-88.5%)	88.7% (87.8-89.6%)	Phi = .018$^{N.E., N.S.}$
Frequent disclosure of content reflecting positive aspects of alcohol (T1)^f	9.4% (8.5-10.2%)	9.6% (8.7-10.4%)	Phi = .004$^{E, N.S.}$
Frequent disclosure of content reflecting negative aspects of alcohol (T1)^f	2.4% (2.0-2.9%)	2.8% (2.3-3.2%)	Phi = .010$^{E, N.S.}$
Frequent exposure to content reflecting positive aspects of alcohol (T1)^f	77.1% (75.9-78.3%)	78.8% (77.6-80.0%)	Phi = .021$^{N.E., *}$
Frequent exposure to content reflecting negative aspects of alcohol (T1)^f	38.1% (36.7-39.4%)	39.4% (38.0-40.8%)	Phi = .014$^{E, N.S.}$

SD Standard deviation, *CI* Confidence interval, *T1* The time of the first wave, *T2* The time of the second wave, *AUDIT* Alcohol Use Disorder Identification Test,
^{1} Equal variance assumed, ^{2} Equal variance not assumed, *E.* Equivalent, *N.E.* Not equivalent, *N.S.* Not significant, * $p<.05$, ** $p<.01$, *** $p<.001$, ^{a} Total scores range 5-20 for each trait, ^{b} Total scores range 0-65, ^{c} Total scores range 0-40, ^{d} Response alternatives = 0 (extremely negative) – 10 (extremely positive), ^{e} 1= Seldom/never, 2 = Less than once a week, 3 = 1 time a week, 4 = 2-3 times a week, 5 = 4-6 times a week, 6 = 1-2 times a day, 7 = Over 3 times a day, ^{f} Frequent = Monthly or more often

Table 2 Mean AUDIT-scores among the frequent disclosure and exposure groups

	Mean AUDIT-score T1 (SD)	Mean AUDIT-score T2 (SD)	Mean change in AUDIT-score from T1 to T2 (SD)
Frequent posting of content reflecting positive aspects of alcohol (T1)	12.50 (4.39)	11.52 (4.76)	-0.87 (3.94)
No frequent posting of content reflecting positive aspects of alcohol (T1)	7.76 (4.63)	7.13 (4.49)	-0.62 (2.91)
Effect size of difference between the two groups	Cohen's d = .61***,[1]	Cohen's d = .57***,[1]	Cohen's d = .11[2]
Frequent posting of content reflecting negative aspects of alcohol use (T1)	13.86 (4.56)	12.19 (5.01)	-1.53 (4.03)
No frequent posting of content reflecting negative aspects of alcohol (T1)	8.05 (4.72)	7.42 (4.62)	-0.62 (2.99)
Effect size of difference between the two groups	Cohen's d = .40***,[1]	Cohen's d = .33***,[1]	Cohen's d = .44*,[2]
Frequent exposure to content reflecting positive aspects of alcohol use (T1)	8.74 (4.78)	8.00 (4.68)	-0.70 (3.06)
No frequent exposure to content reflecting positive aspects of alcohol (T1)	6.24 (4.44)	5.84 (4.41)	-0.43 (2.88)
Effect size of difference between the two groups	Cohen's d = .43***,[1]	Cohen's d = .38***,[1]	Cohen's d = .13*,[2]
Frequent exposure to content reflecting negative aspects of alcohol (T1)	9.27 (4.98)	8.46 (4.85)	-0.80 (3.18)
No frequent exposure to content reflecting negative aspects of alcohol (T1)	7.52 (4.58)	6.95 (4.51)	-0.54 (2.91)
Effect size of difference between the two groups	Cohen's d = .40***,[2]	Cohen's d = .35**,[2]	Cohen's d = .10**,[2]

SD Standard deviation, *AUDIT* Alcohol Use Disorder Identification Test, *T1* The time of the first wave, *T2* The time of the second wave, *CI* Confidence interval, *Frequent* = Monthly or more often, [1] Equal variance assumed, [2] Equal variance not assumed, * p<.05, ** p<.01, *** p<.001

Table 3 Distribution of risky drinking among the frequent disclosure and exposure groups

	Risky drinking (8≤AUDIT T1) (95% CI)	Risky drinking (8≤AUDIT T2) (95% CI)
Frequent posting of content reflecting positive aspects of alcohol (T1)	89.1% (87.1-91.1%)	81.8% (78.1-85.4%)
No frequent posting of content reflecting positive aspects of alcohol (T1)	49.8% (48.8-50.9%)	44.0% (42.5-45.5%)
Effect size of difference between the two groups	Phi = .231***	Phi = .222***
Frequent posting of content reflecting negative aspects of alcohol use (T1)	93.1% (89.9-96.3%)	84.7% (78.2-91.3%)
No frequent posting of content reflecting negative aspects of alcohol (T1)	52.5% (51.5-53.5%)	46.6% (45.1-48.2%)
Effect size of difference between the two groups	Phi = .129***	Phi = .123***
Frequent exposure to content reflecting positive aspects of alcohol use (T1)	58.8% (57.6-59.9%)	51.7% (50.1-53.4%)
No frequent exposure to content reflecting positive aspects of alcohol (T1)	34.8% (32.8-36.9%)	32.2% (29.2-35.2%)
Effect size of difference between the two groups	Phi = .199***	Phi = .160***
Frequent exposure to content reflecting negative aspects of alcohol (T1)	63.1% (61.5-64.7%)	55.9% (53.6-58.3%)
No frequent exposure to content reflecting negative aspects of alcohol (T1)	47.4% (46.1-48.7%)	42.2% (40.3-44.0%)
Effect size of difference between the two groups	Phi = .154***	Phi = .135***

AUDIT Alcohol Use Disorder Identification Test, *T1* The time of the first wave, *T2* The time of the second wave, *CI* Confidence interval, *Frequent* = Monthly or more often, *** p<.001

Table 4 Disclosure/exposure and later alcohol use, while controlling for different covariates ($n = 4{,}342$)

Dependent variables	AUDIT-score T2		Change in AUDIT-scores (T2 – T1)	
	B (S.E.)	Effect size (Completely standardised Betas)	B (S.E.)	Effect size (Completely standardised Betas)
Model 1 (Crude)				
Frequent disclosure of content reflecting positive aspects of alcohol (T1)	4.41 (0.24)***	0.28 (0.02)***	-0.24 (0.20)	-0.02 (0.02)
Frequent disclosure of content reflecting negative aspects of alcohol (T1)	4.79 (0.47)***	0.17 (0.02)***	-0.90 (0.37)*	-0.05 (0.20)*
Frequent exposure to content reflecting positive aspects of alcohol (T1)	2.17 (0.17)***	0.19 (0.01)***	-0.25 (0.11)*	-0.03 (0.01)*
Frequent exposure to content reflecting negative aspects of alcohol (T1)	1.52 (0.15)***	0.16 (0.02)***	-0.24 (0.10)*	-0.04 (0.02)*
Model 2 (Adjusted for demographics and personality factors[a])				
Frequent disclosure of content reflecting positive aspects of alcohol (T1)	3.30 (0.24)***	0.21 (0.02)***	-0.20 (0.20)	-0.02 (0.02)
Frequent disclosure of content reflecting negative aspects of alcohol (T1)	3.17 (0.44)***	0.11 (0.02)***	-0.82 (0.37)*	-0.04 (0.02)*
Frequent exposure to content reflecting positive aspects of alcohol (T1)	1.57 (0.15)***	0.14 (0.01)***	-0.20 (0.11)	-0.03 (0.01)
Frequent exposure to content reflecting negative aspects of alcohol (T1)	0.91 (0.13)***	0.09 (0.01)***	-0.22 (0.09)*	-0.04 (0.02)*
Model 3 (Adjusted for previous social media use and disclosure/exposure[b])				
Frequent disclosure of content reflecting positive aspects of alcohol (T1)	3.21 (0.26)***	0.20 (0.02)***	0.02 (0.21)	0.00 (0.02)
Frequent disclosure of content reflecting negative aspects of alcohol (T1)	1.83 (0.51)***	0.06 (0.02)***	-0.80 (0.40)*	-0.04 (0.02)*
Frequent exposure to content reflecting positive aspects of alcohol (T1)	1.09 (0.17)***	0.10 (0.01)***	-0.15 (0.11)	-0.02 (0.02)
Frequent exposure to content reflecting negative aspects of alcohol (T1)	0.57 (0.14)***	0.06 (0.02)***	-0.15 (0.10)	-0.02 (0.02)
Model 4 (Adjusted for previous alcohol use[c])				
Frequent disclosure of content reflecting positive aspects of alcohol (T1)	0.82 (0.19)***	0.05 (0.01)***	0.83 (0.19)***	0.08 (0.02)***
Frequent disclosure of content reflecting negative aspects of alcohol (T1)	0.33 (0.36)	0.01 (0.01)	0.33 (0.36)	0.02 (0.02)
Frequent exposure to content reflecting positive aspects of alcohol (T1)	0.29 (0.11)**	0.03 (0.01)**	0.28 (0.11)**	0.04 (0.01)**
Frequent exposure to content reflecting negative aspects of alcohol (T1)	0.14 (0.09)	0.02 (0.01)	0.14 (0.09)	0.02 (0.02)
Model 5 (Adjusted for previous alcohol-related cognitions[d])				
Frequent disclosure of content reflecting positive aspects of alcohol (T1)	2.23 (0.24)***	0.14 (0.02)***	0.07 (0.21)	0.01 (0.02)
Frequent disclosure of content reflecting negative aspects of alcohol (T1)	2.11 (0.45)***	0.07 (0.02)***	-0.57 (0.38)	-0.03 (0.02)
Frequent exposure to content reflecting positive aspects of alcohol (T1)	1.05 (0.15)***	0.09 (0.01)***	-0.11 (0.11)	-0.02 (0.02)
Frequent exposure to content reflecting negative aspects of alcohol (T1)	0.64 (0.13)***	0.07 (0.01)***	-0.13 (0.10)	-0.02 (0.02)
Model 6 (Fully adjusted)				
Frequent disclosure of content reflecting positive aspects of alcohol (T1)	0.63 (0.20)**	0.04 (0.01)**	0.64 (0.20)**	0.06 (0.02)**
Frequent disclosure of content reflecting negative aspects of alcohol (T1)	-0.25 (0.37)	-0.01 (0.01)	-0.25 (0.37)	-0.01 (0.02)
Frequent exposure to content reflecting positive aspects of alcohol (T1)	0.15 (0.10)	0.01 (0.01)	0.14 (0.10)	0.02 (0.01)
Frequent exposure to content reflecting negative aspects of alcohol (T1)	-0.04 (0.09)	-0.00 (0.01)	-0.04 (0.09)	-0.01 (0.02)

Covariates are adjusted for one by one. Fully adjusted analyses include all covariates.
AUDIT Alcohol Use Disorder Identification Test, *S.E.* Standard Error, *Frequent* = monthly or more often, reference category: less than monthly, *CI* Confidence interval, *T1* The time of the first wave, *T2* The time of the second wave, * p<.05, ** p<.01, *** p<.001. [a] Age, sex, place of birth, religious identification (T1), relationship status (T1 and T2), student status (T1 and T2), parental status (T2), extroversion (T1), agreeableness (T1), conscientiousness (T1), neuroticism (T1), intellect/imagination (T1), and self-monitoring (T1). [b] Frequency of logins to social media (T1), number of online-friends (T1), having a Snapchat account (T1), and disclosure/exposure of alcohol-related content reflecting positive or negative aspects of alcohol (T1). [c] Alcohol use T1 (AUDIT-score). [d] Prototypic apprehension of the typical heavy drinker and of the typical sharer of alcohol-related content (T1), descriptive norms for alcohol use among co-students and online-friends (T1).

Doctoral Theses at The Faculty of Psychology, University of Bergen

1980	Allen, H.M., Dr. philos.	Parent-offspring interactions in willow grouse (Lagopus L. Lagopus).
1981	Myhrer, T., Dr. philos.	Behavioral Studies after selective disruption of hippocampal inputs in albino rats.
1982	Svebak, S., Dr. philos.	The significance of motivation for task-induced tonic physiological changes.
1983	Myhre, G., Dr. philos.	The Biopsychology of behavior in captive Willow ptarmigan.
	Eide, R., Dr. philos.	PSYCHOSOCIAL FACTORS AND INDICES OF HEALTH RISKS. The relationship of psychosocial conditions to subjective complaints, arterial blood pressure, serum cholesterol, serum triglycerides and urinary catecholamines in middle aged populations in Western Norway.
	Værnes, R.J., Dr. philos.	Neuropsychological effects of diving.
1984	Kolstad, A., Dr. philos.	Til diskusjonen om sammenhengen mellom sosiale forhold og psykiske strukturer. En epidemiologisk undersøkelse blant barn og unge.
	Løberg, T., Dr. philos.	Neuropsychological assessment in alcohol dependence.
1985	Hellesnes, T., Dr. philos.	Læring og problemløsning. En studie av den perseptuelle analysens betydning for verbal læring.
	Håland, W., Dr. philos.	Psykoterapi: relasjon, utviklingsprosess og effekt.
1986	Hagtvet, K.A., Dr. philos.	The construct of test anxiety: Conceptual and methodological issues.
	Jellestad, F.K., Dr. philos.	Effects of neuron specific amygdala lesions on fear-motivated behavior in rats.
1987	Aarø, L.E., Dr. philos.	Health behaviour and sosioeconomic Status. A survey among the adult population in Norway.
	Underlid, K., Dr. philos.	Arbeidsløyse i psykososialt perspektiv.
	Laberg, J.C., Dr. philos.	Expectancy and classical conditioning in alcoholics' craving.
	Vollmer, F.C., Dr. philos.	Essays on explanation in psychology.
	Ellertsen, B., Dr. philos.	Migraine and tension headache: Psychophysiology, personality and therapy.
1988	Kaufmann, A., Dr. philos.	Antisosial atferd hos ungdom. En studie av psykologiske determinanter.

	Mykletun, R.J., Dr. philos.	Teacher stress: personality, work-load and health.
	Havik, O.E., Dr. philos.	After the myocardial infarction: A medical and psychological study with special emphasis on perceived illness.
1989	Bråten, S., Dr. philos.	Menneskedyaden. En teoretisk tese om sinnets dialogiske natur med informasjons- og utviklingspsykologiske implikasjoner sammenholdt med utvalgte spedbarnsstudier.
	Wold, B., Dr. psychol.	Lifestyles and physical activity. A theoretical and empirical analysis of socialization among children and adolescents.
1990	Flaten, M.A., Dr. psychol.	The role of habituation and learning in reflex modification.
1991	Alsaker, F.D., Dr. philos.	Global negative self-evaluations in early adolescence.
	Kraft, P., Dr. philos.	AIDS prevention in Norway. Empirical studies on diffusion of knowledge, public opinion, and sexual behaviour.
	Endresen, I.M., Dr. philos.	Psychoimmuniological stress markers in working life.
	Faleide, A.O., Dr. philos.	Asthma and allergy in childhood. Psychosocial and psychotherapeutic problems.
1992	Dalen, K., Dr. philos.	Hemispheric asymmetry and the Dual-Task Paradigm: An experimental approach.
	Bø, I.B., Dr. philos.	Ungdoms sosiale økologi. En undersøkelse av 14-16 åringers sosiale nettverk.
	Nivison, M.E., Dr. philos.	The relationship between noise as an experimental and environmental stressor, physiological changes and psychological factors.
	Torgersen, A.M., Dr. philos.	Genetic and environmental influence on temperamental behaviour. A longitudinal study of twins from infancy to adolescence.
1993	Larsen, S., Dr. philos.	Cultural background and problem drinking.
	Nordhus, I.H., Dr. philos.	Family caregiving. A community psychological study with special emphasis on clinical interventions.
	Thuen, F., Dr. psychol.	Accident-related behaviour among children and young adolescents: Prediction and prevention.
	Solheim, R., Dr. philos.	Spesifikke lærevansker. Diskrepanskriteriet anvendt i seleksjonsmetodikk.
	Johnsen, B.H., Dr. psychol.	Brain assymetry and facial emotional expressions: Conditioning experiments.
1994	Tønnessen, F.E., Dr. philos.	The etiology of Dyslexia.
	Kvale, G., Dr. psychol.	Psychological factors in anticipatory nausea and vomiting in cancer chemotherapy.

	Asbjørnsen, A.E., Dr. psychol.	Structural and dynamic factors in dichotic listening: An interactional model.
	Bru, E., Dr. philos.	The role of psychological factors in neck, shoulder and low back pain among female hospitale staff.
	Braathen, E.T., Dr. psychol.	Prediction of exellence and discontinuation in different types of sport: The significance of motivation and EMG.
	Johannessen, B.F., Dr. philos.	Det flytende kjønnet. Om lederskap, politikk og identitet.
1995	Sam, D.L., Dr. psychol.	Acculturation of young immigrants in Norway: A psychological and socio-cultural adaptation.
	Bjaalid, I.-K., Dr. philos	Component processes in word recognition.
	Martinsen, Ø., Dr. philos.	Cognitive style and insight.
	Nordby, H., Dr. philos.	Processing of auditory deviant events: Mismatch negativity of event-related brain potentials.
	Raaheim, A., Dr. philos.	Health perception and health behaviour, theoretical considerations, empirical studies, and practical implications.
	Seltzer, W.J., Dr.philos.	Studies of Psychocultural Approach to Families in Therapy.
	Brun, W., Dr.philos.	Subjective conceptions of uncertainty and risk.
	Aas, H.N., Dr. psychol.	Alcohol expectancies and socialization: Adolescents learning to drink.
	Bjørkly, S., Dr. psychol.	Diagnosis and prediction of intra-institutional aggressive behaviour in psychotic patients
1996	Anderssen, Norman, Dr. psychol.	Physical activity of young people in a health perspective: Stability, change and social influences.
	Sandal, Gro Mjeldheim, Dr. psychol.	Coping in extreme environments: The role of personality.
	Strumse, Einar, Dr. philos.	The psychology of aesthetics: explaining visual preferences for agrarian landscapes in Western Norway.
	Hestad, Knut, Dr. philos.	Neuropsychological deficits in HIV-1 infection.
	Lugoe, L.Wycliffe, Dr. philos.	Prediction of Tanzanian students' HIV risk and preventive behaviours
	Sandvik, B. Gunnhild, Dr. philos.	Fra distriktsjordmor til institusjonsjordmor. Fremveksten av en profesjon og en profesjonsutdanning
	Lie, Gro Therese, Dr. psychol.	The disease that dares not speak its name: Studies on factors of importance for coping with HIV/AIDS in Northern Tanzania
	Øygard, Lisbet, Dr. philos.	Health behaviors among young adults. A psychological and sociological approach
	Stormark, Kjell Morten, Dr. psychol.	Emotional modulation of selective attention: Experimental and clinical evidence.

	Einarsen, Ståle, Dr. psychol.	Bullying and harassment at work: epidemiological and psychosocial aspects.
1997	Knivsberg, Ann-Mari, Dr. philos.	Behavioural abnormalities and childhood psychopathology: Urinary peptide patterns as a potential tool in diagnosis and remediation.
	Eide, Arne H., Dr. philos.	Adolescent drug use in Zimbabwe. Cultural orientation in a global-local perspective and use of psychoactive substances among secondary school students.
	Sørensen, Marit, Dr. philos.	The psychology of initiating and maintaining exercise and diet behaviour.
	Skjæveland, Oddvar, Dr. psychol.	Relationships between spatial-physical neighborhood attributes and social relations among neighbors.
	Zewdie, Teka, Dr. philos.	Mother-child relational patterns in Ethiopia. Issues of developmental theories and intervention programs.
	Wilhelmsen, Britt Unni, Dr. philos.	Development and evaluation of two educational programmes designed to prevent alcohol use among adolescents.
	Manger, Terje, Dr. philos.	Gender differences in mathematical achievement among Norwegian elementary school students.
1998 V	Lindstrøm, Torill Christine, Dr. philos.	«Good Grief»: Adapting to Bereavement.
	Skogstad, Anders, Dr. philos.	Effects of leadership behaviour on job satisfaction, health and efficiency.
	Haldorsen, Ellen M. Håland, Dr. psychol.	Return to work in low back pain patients.
	Besemer, Susan P., Dr. philos.	Creative Product Analysis: The Search for a Valid Model for Understanding Creativity in Products.
H	Winje, Dagfinn, Dr. psychol.	Psychological adjustment after severe trauma. A longitudinal study of adults' and children's posttraumatic reactions and coping after the bus accident in Måbødalen, Norway 1988.
	Vosburg, Suzanne K., Dr. philos.	The effects of mood on creative problem solving.
	Eriksen, Hege R., Dr. philos.	Stress and coping: Does it really matter for subjective health complaints?
	Jakobsen, Reidar, Dr. psychol.	Empiriske studier av kunnskap og holdninger om hiv/aids og den normative seksuelle utvikling i ungdomsårene.
1999 V	Mikkelsen, Aslaug, Dr. philos.	Effects of learning opportunities and learning climate on occupational health.
	Samdal, Oddrun, Dr. philos.	The school environment as a risk or resource for students' health-related behaviours and subjective well-being.
	Friestad, Christine, Dr. philos.	Social psychological approaches to smoking.
	Ekeland, Tor-Johan, Dr. philos.	Meining som medisin. Ein analyse av placebofenomenet og implikasjoner for terapi og terapeutiske teoriar.

H	Saban, Sara, Dr. psychol.	Brain Asymmetry and Attention: Classical Conditioning Experiments.
	Carlsten, Carl Thomas, Dr. philos.	God lesing – God læring. En aksjonsrettet studie av undervisning i fagtekstlesing.
	Dundas, Ingrid, Dr. psychol.	Functional and dysfunctional closeness. Family interaction and children's adjustment.
	Engen, Liv, Dr. philos.	Kartlegging av leseferdighet på småskoletrinnet og vurdering av faktorer som kan være av betydning for optimal leseutvikling.
2000 V	Hovland, Ole Johan, Dr. philos.	Transforming a self-preserving "alarm" reaction into a self-defeating emotional response: Toward an integrative approach to anxiety as a human phenomenon.
	Lillejord, Sølvi, Dr. philos.	Handlingsrasjonalitet og spesialundervisning. En analyse av aktørperspektiver.
	Sandell, Ove, Dr. philos.	Den varme kunnskapen.
	Oftedal, Marit Petersen, Dr. philos.	Diagnostisering av ordavkodingsvansker: En prosessanalytisk tilnærmingsmåte.
H	Sandbak, Tone, Dr. psychol.	Alcohol consumption and preference in the rat: The significance of individual differences and relationships to stress pathology
	Eid, Jarle, Dr. psychol.	Early predictors of PTSD symptom reporting; The significance of contextual and individual factors.
2001 V	Skinstad, Anne Helene, Dr. philos.	Substance dependence and borderline personality disorders.
	Binder, Per-Einar, Dr. psychol.	Individet og den meningsbærende andre. En teoretisk undersøkelse av de mellommenneskelige forutsetningene for psykisk liv og utvikling med utgangspunkt i Donald Winnicotts teori.
	Roald, Ingvild K., Dr. philos.	Building of concepts. A study of Physics concepts of Norwegian deaf students.
H	Fekadu, Zelalem W., Dr. philos.	Predicting contraceptive use and intention among a sample of adolescent girls. An application of the theory of planned behaviour in Ethiopian context.
	Melesse, Fantu, Dr. philos.	The more intelligent and sensitive child (MISC) mediational intervention in an Ethiopian context: An evaluation study.
	Råheim, Målfrid, Dr. philos.	Kvinners kroppserfaring og livssammenheng. En fenomenologisk – hermeneutisk studie av friske kvinner og kvinner med kroniske muskelsmerter.
	Engelsen, Birthe Kari, Dr. psychol.	Measurement of the eating problem construct.
	Lau, Bjørn, Dr. philos.	Weight and eating concerns in adolescence.
2002 V	Ihlebæk, Camilla, Dr. philos.	Epidemiological studies of subjective health complaints.

	Rosén, Gunnar O. R., Dr. philos.	The phantom limb experience. Models for understanding and treatment of pain with hypnosis.
	Høines, Marit Johnsen, Dr. philos.	Fleksible språkrom. Matematikklæring som tekstutvikling.
	Anthun, Roald Andor, Dr. philos.	School psychology service quality. Consumer appraisal, quality dimensions, and collaborative improvement potential
	Pallesen, Ståle, Dr. psychol.	Insomnia in the elderly. Epidemiology, psychological characteristics and treatment.
	Midthassel, Unni Vere, Dr. philos.	Teacher involvement in school development activity. A study of teachers in Norwegian compulsory schools
	Kallestad, Jan Helge, Dr. philos.	Teachers, schools and implementation of the Olweus Bullying Prevention Program.
H	Ofte, Sonja Helgesen, Dr. psychol.	Right-left discrimination in adults and children.
	Netland, Marit, Dr. psychol.	Exposure to political violence. The need to estimate our estimations.
	Diseth, Åge, Dr. psychol.	Approaches to learning: Validity and prediction of academic performance.
	Bjuland, Raymond, Dr. philos.	Problem solving in geometry. Reasoning processes of student teachers working in small groups: A dialogical approach.
2003 V	Arefjord, Kjersti, Dr. psychol.	After the myocardial infarction – the wives' view. Short- and long-term adjustment in wives of myocardial infarction patients.
	Ingjaldsson, Jón Þorvaldur, Dr. psychol.	Unconscious Processes and Vagal Activity in Alcohol Dependency.
	Holden, Børge, Dr. philos.	Følger av atferdsanalytiske forklaringer for atferdsanalysens tilnærming til utforming av behandling.
	Holsen, Ingrid, Dr. philos.	Depressed mood from adolescence to 'emerging adulthood'. Course and longitudinal influences of body image and parent-adolescent relationship.
	Hammar, Åsa Karin, Dr. psychol.	Major depression and cognitive dysfunction- An experimental study of the cognitive effort hypothesis.
	Sprugevica, Ieva, Dr. philos.	The impact of enabling skills on early reading acquisition.
	Gabrielsen, Egil, Dr. philos.	LESE FOR LIVET. Lesekompetansen i den norske voksenbefolkningen sett i lys av visjonen om en enhetsskole.
H	Hansen, Anita Lill, Dr. psychol.	The influence of heart rate variability in the regulation of attentional and memory processes.
	Dyregrov, Kari, Dr. philos.	The loss of child by suicide, SIDS, and accidents: Consequences, needs and provisions of help.
2004 V	Torsheim, Torbjørn, Dr. psychol.	Student role strain and subjective health complaints: Individual, contextual, and longitudinal perspectives.

	Haugland, Bente Storm Mowatt Dr. psychol.	Parental alcohol abuse. Family functioning and child adjustment.
	Milde, Anne Marita, Dr. psychol.	Ulcerative colitis and the role of stress. Animal studies of psychobiological factors in relationship to experimentally induced colitis.
	Stornes, Tor, Dr. philos.	Socio-moral behaviour in sport. An investigation of perceptions of sportspersonship in handball related to important factors of socio-moral influence.
	Mæhle, Magne, Dr. philos.	Re-inventing the child in family therapy: An investigation of the relevance and applicability of theory and research in child development for family therapy involving children.
	Kobbeltvedt, Therese, Dr. psychol.	Risk and feelings: A field approach.
2004 H	Thomsen, Tormod, Dr. psychol.	Localization of attention in the brain.
	Løberg, Else-Marie, Dr. psychol.	Functional laterality and attention modulation in schizophrenia: Effects of clinical variables.
	Kyrkjebø, Jane Mikkelsen, Dr. philos.	Learning to improve: Integrating continuous quality improvement learning into nursing education.
	Laumann, Karin, Dr. psychol.	Restorative and stress-reducing effects of natural environments: Experiencal, behavioural and cardiovascular indices.
	Holgersen, Helge, PhD	Mellom oss - Essay i relasjonell psykoanalyse.
2005 V	Hetland, Hilde, Dr. psychol.	Leading to the extraordinary? Antecedents and outcomes of transformational leadership.
	Iversen, Anette Christine, Dr. philos.	Social differences in health behaviour: the motivational role of perceived control and coping.
2005 H	Mathisen, Gro Ellen, PhD	Climates for creativity and innovation: Definitions, measurement, predictors and consequences.
	Sævi, Tone, Dr. philos.	Seeing disability pedagogically – The lived experience of disability in the pedagogical encounter.
	Wiium, Nora, PhD	Intrapersonal factors, family and school norms: combined and interactive influence on adolescent smoking behaviour.
	Kanagaratnam, Pushpa, PhD	Subjective and objective correlates of Posttraumatic Stress in immigrants/refugees exposed to political violence.
	Larsen, Torill M. B. , PhD	Evaluating principals` and teachers` implementation of Second Step. A case study of four Norwegian primary schools.
	Bancila, Delia, PhD	Psychosocial stress and distress among Romanian adolescents and adults.
2006 V	Hillestad, Torgeir Martin, Dr. philos.	Normalitet og avvik. Forutsetninger for et objektivt psykopatologisk avviksbegrep. En psykologisk, sosial, erkjennelsesteoretisk og teorihistorisk framstilling.

	Nordanger, Dag Øystein, Dr. psychol.	Psychosocial discourses and responses to political violence in post-war Tigray, Ethiopia.
	Rimol, Lars Morten, PhD	Behavioral and fMRI studies of auditory laterality and speech sound processing.
	Krumsvik, Rune Johan, Dr. philos.	ICT in the school. ICT-initiated school development in lower secondary school.
	Norman, Elisabeth, Dr. psychol.	Gut feelings and unconscious thought: An exploration of fringe consiousness in implicit cognition.
	Israel, K Pravin, Dr. psychol.	Parent involvement in the mental health care of children and adolescents. Emperical studies from clinical care setting.
	Glasø, Lars, PhD	Affects and emotional regulation in leader-subordinate relationships.
	Knutsen, Ketil, Dr. philos.	HISTORIER UNGDOM LEVER – En studie av hvordan ungdommer bruker historie for å gjøre livet meningsfullt.
	Matthiesen, Stig Berge, PhD	Bullying at work. Antecedents and outcomes.
2006 H	Gramstad, Arne, PhD	Neuropsychological assessment of cognitive and emotional functioning in patients with epilepsy.
	Bendixen, Mons, PhD	Antisocial behaviour in early adolescence: Methodological and substantive issues.
	Mrumbi, Khalifa Maulid, PhD	Parental illness and loss to HIV/AIDS as experienced by AIDS orphans aged between 12-17 years from Temeke District, Dar es Salaam, Tanzania: A study of the children's psychosocial health and coping responses.
	Hetland, Jørn, Dr. psychol.	The nature of subjective health complaints in adolescence: Dimensionality, stability, and psychosocial predictors
	Kakoko, Deodatus Conatus Vitalis, PhD	Voluntary HIV counselling and testing service uptake among primary school teachers in Mwanza, Tanzania: assessment of socio-demographic, psychosocial and socio-cognitive aspects
	Mykletun, Arnstein, Dr. psychol.	Mortality and work-related disability as long-term consequences of anxiety and depression: Historical cohort designs based on the HUNT-2 study
	Sivertsen, Børge, PhD	Insomnia in older adults. Consequences, assessment and treatment.
2007 V	Singhammer, John, Dr. philos.	Social conditions from before birth to early adulthood – the influence on health and health behaviour
	Janvin, Carmen Ani Cristea, PhD	Cognitive impairment in patients with Parkinson's disease: profiles and implications for prognosis
	Braarud, Hanne Cecilie, Dr.psychol.	Infant regulation of distress: A longitudinal study of transactions between mothers and infants
	Tveito, Torill Helene, PhD	Sick Leave and Subjective Health Complaints

	Magnussen, Liv Heide, PhD	Returning disability pensioners with back pain to work
	Thuen, Elin Marie, Dr.philos.	Learning environment, students' coping styles and emotional and behavioural problems. A study of Norwegian secondary school students.
	Solberg, Ole Asbjørn, PhD	Peacekeeping warriors – A longitudinal study of Norwegian peacekeepers in Kosovo
2007 H	Søreide, Gunn Elisabeth, Dr.philos.	Narrative construction of teacher identity
	Svensen, Erling, PhD	WORK & HEALTH. Cognitive Activation Theory of Stress applied in an organisational setting.
	Øverland, Simon Nygaard, PhD	Mental health and impairment in disability benefits. Studies applying linkages between health surveys and administrative registries.
	Eichele, Tom, PhD	Electrophysiological and Hemodynamic Correlates of Expectancy in Target Processing
	Børhaug, Kjetil, Dr.philos.	Oppseding til demokrati. Ein studie av politisk oppseding i norsk skule.
	Eikeland, Thorleif, Dr.philos.	Om å vokse opp på barnehjem og på sykehus. En undersøkelse av barnehjemsbarns opplevelser på barnehjem sammenholdt med sanatoriebarns beskrivelse av langvarige sykehusopphold – og et forsøk på forklaring.
	Wadel, Carl Cato, Dr.philos.	Medarbeidersamhandling og medarbeiderledelse i en lagbasert organisasjon
	Vinje, Hege Forbech, PhD	Thriving despite adversity: Job engagement and self-care among community nurses
	Noort, Maurits van den, PhD	Working memory capacity and foreign language acquisition
2008 V	Breivik, Kyrre, Dr.psychol.	The Adjustment of Children and Adolescents in Different Post-Divorce Family Structures. A Norwegian Study of Risks and Mechanisms.
	Johnsen, Grethe E., PhD	Memory impairment in patients with posttraumatic stress disorder
	Sætrevik, Bjørn, PhD	Cognitive Control in Auditory Processing
	Carvalhosa, Susana Fonseca, PhD	Prevention of bullying in schools: an ecological model
2008 H	Brønnick, Kolbjørn Selvåg	Attentional dysfunction in dementia associated with Parkinson's disease.
	Posserud, Maj-Britt Rocio	Epidemiology of autism spectrum disorders
	Haug, Ellen	Multilevel correlates of physical activity in the school setting
	Skjerve, Arvid	Assessing mild dementia – a study of brief cognitive tests.

	Kjønniksen, Lise	The association between adolescent experiences in physical activity and leisure time physical activity in adulthood: a ten year longitudinal study
	Gundersen, Hilde	The effects of alcohol and expectancy on brain function
	Omvik, Siri	Insomnia – a night and day problem
2009 V	Molde, Helge	Pathological gambling: prevalence, mechanisms and treatment outcome.
	Foss, Else	Den omsorgsfulle væremåte. En studie av voksnes væremåte i forhold til barn i barnehagen.
	Westrheim, Kariane	Education in a Political Context: A study of Konwledge Processes and Learning Sites in the PKK.
	Wehling, Eike	Cognitive and olfactory changes in aging
	Wangberg, Silje C.	Internet based interventions to support health behaviours: The role of self-efficacy.
	Nielsen, Morten B.	Methodological issues in research on workplace bullying. Operationalisations, measurements and samples.
	Sandu, Anca Larisa	MRI measures of brain volume and cortical complexity in clinical groups and during development.
	Guribye, Eugene	Refugees and mental health interventions
	Sørensen, Lin	Emotional problems in inattentive children – effects on cognitive control functions.
	Tjomsland, Hege E.	Health promotion with teachers. Evaluation of the Norwegian Network of Health Promoting Schools: Quantitative and qualitative analyses of predisposing, reinforcing and enabling conditions related to teacher participation and program sustainability.
	Helleve, Ingrid	Productive interactions in ICT supported communities of learners
2009 H	Skorpen, Aina Øye, Christine	Dagliglivet i en psykiatrisk institusjon: En analyse av miljøterapeutiske praksiser
	Andreassen, Cecilie Schou	WORKAHOLISM – Antecedents and Outcomes
	Stang, Ingun	Being in the same boat: An empowerment intervention in breast cancer self-help groups
	Sequeira, Sarah Dorothee Dos Santos	The effects of background noise on asymmetrical speech perception
	Kleiven, Jo, dr.philos.	The Lillehammer scales: Measuring common motives for vacation and leisure behavior
	Jónsdóttir, Guðrún	Dubito ergo sum? Ni jenter møter naturfaglig kunnskap.
	Hove, Oddbjørn	Mental health disorders in adults with intellectual disabilities - Methods of assessment and prevalence of mental health disorders and problem behaviour
	Wageningen, Heidi Karin van	The role of glutamate on brain function

	Bjørkvik, Jofrid	God nok? Selvaktelse og interpersonlig fungering hos pasienter innen psykisk helsevern: Forholdet til diagnoser, symptomer og behandlingsutbytte
	Andersson, Martin	A study of attention control in children and elderly using a forced-attention dichotic listening paradigm
	Almås, Aslaug Grov	Teachers in the Digital Network Society: Visions and Realities. A study of teachers' experiences with the use of ICT in teaching and learning.
	Ulvik, Marit	Lærerutdanning som danning? Tre stemmer i diskusjonen
2010 V	Skår, Randi	Læringsprosesser i sykepleieres profesjonsutøvelse. En studie av sykepleieres læringserfaringer.
	Roald, Knut	Kvalitetsvurdering som organisasjonslæring mellom skole og skoleeigar
	Lunde, Linn-Heidi	Chronic pain in older adults. Consequences, assessment and treatment.
	Danielsen, Anne Grete	Perceived psychosocial support, students' self-reported academic initiative and perceived life satisfaction
	Hysing, Mari	Mental health in children with chronic illness
	Olsen, Olav Kjellevold	Are good leaders moral leaders? The relationship between effective military operational leadership and morals
	Riese, Hanne	Friendship and learning. Entrepreneurship education through mini-enterprises.
	Holthe, Asle	Evaluating the implementation of the Norwegian guidelines for healthy school meals: A case study involving three secondary schools
H	Hauge, Lars Johan	Environmental antecedents of workplace bullying: A multi-design approach
	Bjørkelo, Brita	Whistleblowing at work: Antecedents and consequences
	Reme, Silje Endresen	Common Complaints – Common Cure? Psychiatric comorbidity and predictors of treatment outcome in low back pain and irritable bowel syndrome
	Helland, Wenche Andersen	Communication difficulties in children identified with psychiatric problems
	Beneventi, Harald	Neuronal correlates of working memory in dyslexia
	Thygesen, Elin	Subjective health and coping in care-dependent old persons living at home
	Aanes, Mette Marthinussen	Poor social relationships as a threat to belongingness needs. Interpersonal stress and subjective health complaints: Mediating and moderating factors.
	Anker, Morten Gustav	Client directed outcome informed couple therapy

	Bull, Torill	Combining employment and child care: The subjective well-being of single women in Scandinavia and in Southern Europe
	Viig, Nina Grieg	Tilrettelegging for læreres deltakelse i helsefremmende arbeid. En kvalitativ og kvantitativ analyse av sammenhengen mellom organisatoriske forhold og læreres deltakelse i utvikling og implementering av Europeisk Nettverk av Helsefremmende Skoler i Norge
	Wolff, Katharina	To know or not to know? Attitudes towards receiving genetic information among patients and the general public.
	Ogden, Terje, dr.philos.	Familiebasert behandling av alvorlige atferdsproblemer blant barn og ungdom. Evaluering og implementering av evidensbaserte behandlingsprogrammer i Norge.
	Solberg, Mona Elin	Self-reported bullying and victimisation at school: Prevalence, overlap and psychosocial adjustment.
2011 V	Bye, Hege Høivik	Self-presentation in job interviews. Individual and cultural differences in applicant self-presentation during job interviews and hiring managers' evaluation
	Notelaers, Guy	Workplace bullying. A risk control perspective.
	Moltu, Christian	Being a therapist in difficult therapeutic impasses. A hermeneutic phenomenological analysis of skilled psychotherapists' experiences, needs, and strategies in difficult therapies ending well.
	Myrseth, Helga	Pathological Gambling - Treatment and Personality Factors
	Schanche, Elisabeth	From self-criticism to self-compassion. An empirical investigation of hypothesized change prosesses in the Affect Phobia Treatment Model of short-term dynamic psychotherapy for patients with Cluster C personality disorders.
	Våpenstad, Eystein Victor, dr.philos.	Det tempererte nærvær. En teoretisk undersøkelse av psykoterapautens subjektivitet i psykoanalyse og psykoanalytisk psykoterapi.
	Haukebø, Kristin	Cognitive, behavioral and neural correlates of dental and intra-oral injection phobia. Results from one treatment and one fMRI study of randomized, controlled design.
	Harris, Anette	Adaptation and health in extreme and isolated environments. From 78°N to 75°S.
	Bjørknes, Ragnhild	Parent Management Training-Oregon Model: intervention effects on maternal practice and child behavior in ethnic minority families
	Mamen, Asgeir	Aspects of using physical training in patients with substance dependence and additional mental distress
	Espevik, Roar	Expert teams: Do shared mental models of team members make a difference
	Haara, Frode Olav	Unveiling teachers' reasons for choosing practical activities in mathematics teaching

2011 **H**	Hauge, Hans Abraham	How can employee empowerment be made conducive to both employee health and organisation performance? An empirical investigation of a tailor-made approach to organisation learning in a municipal public service organisation.
	Melkevik, Ole Rogstad	Screen-based sedentary behaviours: pastimes for the poor, inactive and overweight? A cross-national survey of children and adolescents in 39 countries.
	Vøllestad, Jon	Mindfulness-based treatment for anxiety disorders. A quantitative review of the evidence, results from a randomized controlled trial, and a qualitative exploration of patient experiences.
	Tolo, Astrid	Hvordan blir lærerkompetanse konstruert? En kvalitativ studie av PPU-studenters kunnskapsutvikling.
	Saus, Evelyn-Rose	Training effectiveness: Situation awareness training in simulators
	Nordgreen, Tine	Internet-based self-help for social anxiety disorder and panic disorder. Factors associated with effect and use of self-help.
	Munkvold, Linda Helen	Oppositional Defiant Disorder: Informant discrepancies, gender differences, co-occuring mental health problems and neurocognitive function.
	Christiansen, Øivin	Når barn plasseres utenfor hjemmet: beslutninger, forløp og relasjoner. Under barnevernets (ved)tak.
	Brunborg, Geir Scott	Conditionability and Reinforcement Sensitivity in Gambling Behaviour
	Hystad, Sigurd William	Measuring Psychological Resiliency: Validation of an Adapted Norwegian Hardiness Scale
2012 **V**	Roness, Dag	Hvorfor bli lærer? Motivasjon for utdanning og utøving.
	Fjermestad, Krister Westlye	The therapeutic alliance in cognitive behavioural therapy for youth anxiety disorders
	Jenssen, Eirik Sørnes	Tilpasset opplæring i norsk skole: politikeres, skolelederes og læreres handlingsvalg
	Saksvik-Lehouillier, Ingvild	Shift work tolerance and adaptation to shift work among offshore workers and nurses
	Johansen, Venke Frederike	Når det intime blir offentlig. Om kvinners åpenhet om brystkreft og om markedsføring av brystkreftsaken.
	Herheim, Rune	Pupils collaborating in pairs at a computer in mathematics learning: investigating verbal communication patterns and qualities
	Vie, Tina Løkke	Cognitive appraisal, emotions and subjective health complaints among victims of workplace bullying: A stress-theoretical approach
	Jones, Lise Øen	Effects of reading skills, spelling skills and accompanying efficacy beliefs on participation in education. A study in Norwegian prisons.

2012 H	Danielsen, Yngvild Sørebø	Childhood obesity – characteristics and treatment. Psychological perspectives.
	Horverak, Jøri Gytre	Sense or sensibility in hiring processes. Interviewee and interviewer characteristics as antecedents of immigrant applicants' employment probabilities. An experimental approach.
	Jøsendal, Ola	Development and evaluation of BE smokeFREE, a school-based smoking prevention program
	Osnes, Berge	Temporal and Posterior Frontal Involvement in Auditory Speech Perception
	Drageset, Sigrunn	Psychological distress, coping and social support in the diagnostic and preoperative phase of breast cancer
	Aasland, Merethe Schanke	Destructive leadership: Conceptualization, measurement, prevalence and outcomes
	Bakibinga, Pauline	The experience of job engagement and self-care among Ugandan nurses and midwives
	Skogen, Jens Christoffer	Foetal and early origins of old age health. Linkage between birth records and the old age cohort of the Hordaland Health Study (HUSK)
	Leversen, Ingrid	Adolescents' leisure activity participation and their life satisfaction: The role of demographic characteristics and psychological processes
	Hanss, Daniel	Explaining sustainable consumption: Findings from cross-sectional and intervention approaches
	Rød, Per Arne	Barn i klem mellom foreldrekonflikter og samfunnsmessig beskyttelse
2013 V	Mentzoni, Rune Aune	Structural Characteristics in Gambling
	Knudsen, Ann Kristin	Long-term sickness absence and disability pension award as consequences of common mental disorders. Epidemiological studies using a population-based health survey and official ill health benefit registries.
	Strand, Mari	Emotional information processing in recurrent MDD
	Veseth, Marius	Recovery in bipolar disorder. A reflexive-collaborative exploration of the lived experiences of healing and growth when battling a severe mental illness
	Mæland, Silje	Sick leave for patients with severe subjective health complaints. Challenges in general practice.
	Mjaaland, Thera	At the frontiers of change? Women and girls' pursuit of education in north-western Tigray, Ethiopia
	Odéen, Magnus	Coping at work. The role of knowledge and coping expectancies in health and sick leave.
	Hynninen, Kia Minna Johanna	Anxiety, depression and sleep disturbance in chronic obstructive pulmonary disease (COPD). Associations, prevalence and effect of psychological treatment.

	Flo, Elisabeth	Sleep and health in shift working nurses
	Aasen, Elin Margrethe	From paternalism to patient participation? The older patients undergoing hemodialysis, their next of kin and the nurses: a discursive perspective on perception of patient participation in dialysis units
	Ekornås, Belinda	Emotional and Behavioural Problems in Children: Self-perception, peer relationships, and motor abilities
	Corbin, J. Hope	North-South Partnerships for Health: Key Factors for Partnership Success from the Perspective of the KIWAKKUKI
	Birkeland, Marianne Skogbrott	Development of global self-esteem: The transition from adolescence to adulthood
2013 H	Gianella-Malca, Camila	Challenges in Implementing the Colombian Constitutional Court's Health-Care System Ruling of 2008
	Hovland, Anders	Panic disorder – Treatment outcomes and psychophysiological concomitants
	Mortensen, Øystein	The transition to parenthood – Couple relationships put to the test
	Årdal, Guro	Major Depressive Disorder – a Ten Year Follow-up Study. Inhibition, Information Processing and Health Related Quality of Life
	Johansen, Rino Bandlitz	The impact of military identity on performance in the Norwegian armed forces
	Bøe, Tormod	Socioeconomic Status and Mental Health in Children and Adolescents
2014 V	Nordmo, Ivar	Gjennom nåløyet – studenters læringserfaringer i psykologutdanningen
	Dovran, Anders	Childhood Trauma and Mental Health Problems in Adult Life
	Hegelstad, Wenche ten Velden	Early Detection and Intervention in Psychosis: A Long-Term Perspective
	Urheim, Ragnar	Forståelse av pasientaggresjon og forklaringer på nedgang i voldsrate ved Regional sikkerhetsavdeling, Sandviken sykehus
	Kinn, Liv Grethe	Round-Trips to Work. Qualitative studies of how persons with severe mental illness experience work integration.
	Rød, Anne Marie Kinn	Consequences of social defeat stress for behaviour and sleep. Short-term and long-term assessments in rats.
	Nygård, Merethe	Schizophrenia – Cognitive Function, Brain Abnormalities, and Cannabis Use
	Tjora, Tore	Smoking from adolescence through adulthood: the role of family, friends, depression and socioeconomic status. Predictors of smoking from age 13 to 30 in the "The Norwegian Longitudinal Health Behaviour Study" (NLHB)
	Vangsnes, Vigdis	The Dramaturgy and Didactics of Computer Gaming. A Study of a Medium in the Educational Context of Kindergartens.

	Nordahl, Kristin Berg	Early Father-Child Interaction in a Father-Friendly Context: Gender Differences, Child Outcomes, and Protective Factors related to Fathers' Parenting Behaviors with One-year-olds
2014 H	Sandvik, Asle Makoto	Psychopathy – the heterogenety of the construct
	Skotheim, Siv	Maternal emotional distress and early mother-infant interaction: Psychological, social and nutritional contributions
	Halleland, Helene Barone	Executive Functioning in adult Attention Deficit Hyperactivity Disorder (ADHD). From basic mechanisms to functional outcome.
	Halvorsen, Kirsti Vindal	Partnerskap i lærerutdanning, sett fra et økologisk perspektiv
	Solbue, Vibeke	Dialogen som visker ut kategorier. En studie av hvilke erfaringer innvandrerungdommer og norskfødte med innvandrerforeldre har med videregående skole. Hva forteller ungdommenes erfaringer om videregående skoles håndtering av etniske ulikheter?
	Kvalevaag, Anne Lise	Fathers' mental health and child development. The predictive value of fathers' psychological distress during pregnancy for the social, emotional and behavioural development of their children
	Sandal, Ann Karin	Ungdom og utdanningsval. Om elevar sine opplevingar av val og overgangsprosessar.
	Haug, Thomas	Predictors and moderators of treatment outcome from high- and low-intensity cognitive behavioral therapy for anxiety disorders. Association between patient and process factors, and the outcome from guided self-help, stepped care, and face-to-face cognitive behavioral therapy.
	Sjølie, Hege	Experiences of Members of a Crisis Resolution Home Treatment Team. Personal history, professional role and emotional support in a CRHT team.
	Falkenberg, Liv Eggset	Neuronal underpinnings of healthy and dysfunctional cognitive control
	Mrdalj, Jelena	The early life condition. Importance for sleep, circadian rhythmicity, behaviour and response to later life challenges
	Hesjedal, Elisabeth	Tverrprofesjonelt samarbeid mellom skule og barnevern: Kva kan støtte utsette barn og unge?
2015 V	Hauken, May Aasebø	«*The cancer treatment was only half the work!*» A Mixed-Method Study of Rehabilitation among Young Adult Cancer Survivors
	Ryland, Hilde Katrin	Social functioning and mental health in children: the influence of chronic illness and intellectual function
	Rønsen, Anne Kristin	Vurdering som profesjonskompetanse. Refleksjonsbasert utvikling av læreres kompetanse i formativ vurdering

	Hoff, Helge Andreas	Thinking about Symptoms of Psychopathy in Norway: Content Validation of the Comprehensive Assessment of Psychopathic Personality (CAPP) Model in a Norwegian Setting
	Schmid, Marit Therese	Executive Functioning in recurrent- and first episode Major Depressive Disorder. Longitudinal studies
	Sand, Liv	Body Image Distortion and Eating Disturbances in Children and Adolescents
	Matanda, Dennis Juma	Child physical growth and care practices in Kenya: Evidence from Demographic and Health Surveys
	Amugsi, Dickson Abanimi	Child care practices, resources for care, and nutritional outcomes in Ghana: Findings from Demographic and Health Surveys
	Jakobsen, Hilde	The good beating: Social norms supporting men's partner violence in Tanzania
	Sagoe, Dominic	Nonmedical anabolic-androgenic steroid use: Prevalence, attitudes, and social perception
	Eide, Helene Marie Kjærgård	Narrating the relationship between leadership and learning outcomes. A study of public narratives in the Norwegian educational sector.
2015 H	Wubs, Annegreet Gera	Intimate partner violence among adolescents in South Africa and Tanzania
	Hjelmervik, Helene Susanne	Sex and sex-hormonal effects on brain organization of fronto-parietal networks
	Dahl, Berit Misund	The meaning of professional identity in public health nursing
	Røykenes, Kari	Testangst hos sykepleierstudenter: «Alternativ behandling»
	Bless, Josef Johann	The smartphone as a research tool in psychology. Assessment of language lateralization and training of auditory attention.
	Løvvik, Camilla Margrethe Sigvaldsen	Common mental disorders and work participation – the role of return-to-work expectations
	Lehmann, Stine	Mental Disorders in Foster Children: A Study of Prevalence, Comorbidity, and Risk Factors
	Knapstad, Marit	Psychological factors in long-term sickness absence: the role of shame and social support. Epidemiological studies based on the Health Assets Project.
2016 V	Kvestad, Ingrid	Biological risks and neurodevelopment in young North Indian children
	Sælør, Knut Tore	Hinderløyper, halmstrå og hengende snører. En kvalitativ studie av håp innenfor psykisk helse- og rusfeltet.
	Mellingen, Sonja	Alkoholbruk, partilfredshet og samlivsstatus. Før, inn i, og etter svangerskapet – korrelater eller konsekvenser?
	Thun, Eirunn	Shift work: negative consequences and protective factors

	Hilt, Line Torbjørnsen	The borderlands of educational inclusion. Analyses of inclusion and exclusion processes for minority language students
	Havnen, Audun	Treatment of obsessive-compulsive disorder and the importance of assessing clinical effectiveness
	Slåtten, Hilde	Gay-related name-calling among young adolescents. Exploring the importance of the context.
	Ree, Eline	Staying at work. The role of expectancies and beliefs in health and workplace interventions.
	Morken, Frøydis	Reading and writing processing in dyslexia
2016 H	Løvoll, Helga Synnevåg	Inside the outdoor experience. On the distinction between pleasant and interesting feelings and their implication in the motivational process.
	Hjeltnes, Aslak	Facing social fears: An investigation of mindfulness-based stress reduction for young adults with social anxiety disorder
	Øyeflaten, Irene Larsen	Long-term sick leave and work rehabilitation. Prognostic factors for return to work.
	Henriksen, Roger Ekeberg	Social relationships, stress and infection risk in mother and child
	Johnsen, Iren	«Only a friend» - The bereavement process of young adults who have lost a friend to a traumatic death. A mixed methods study.
	Helle, Siri	Cannabis use in non-affective psychoses: Relationship to age at onset, cognitive functioning and social cognition
	Glambek, Mats	Workplace bullying and expulsion in working life. A representative study addressing prospective associations and explanatory conditions.
	Oanes, Camilla Jensen	Tilbakemelding i terapi. På hvilke måter opplever terapeuter at tilbakemeldingsprosedyrer kan virke inn på terapeutiske praksiser?
	Reknes, Iselin	Exposure to workplace bullying among nurses: Health outcomes and individual coping
	Chimhutu, Victor	Results-Based Financing (RBF) in the health sector of a low-income country. From agenda setting to implementation: The case of Tanzania
	Ness, Ingunn Johanne	The Room of Opportunity. Understanding how knowledge and ideas are constructed in multidisciplinary groups working with developing innovative ideas.
	Hollekim, Ragnhild	Contemporary discourses on children and parenting in Norway. An empirical study based on two cases.
	Doran, Rouven	Eco-friendly travelling: The relevance of perceived norms and social comparison
2017 V	Katisi, Masego	The power of context in health partnerships: Exploring synergy and antagony between external and internal ideologies in implementing Safe Male Circumcision (SMC) for HIV prevention in Botswana

	Jamaludin, Nor Lelawati Binti	The "why" and "how" of International Students' Ambassadorship Roles in International Education
	Berthelsen, Mona	Effects of shift work and psychological and social work factors on mental distress. Studies of onshore/offshore workers and nurses in Norway.
	Krane, Vibeke	Lærer-elev-relasjoner, elevers psykiske helse og frafall i videregående skole – en eksplorerende studie om samarbeid og den store betydningen av de små ting
	Søvik, Margaret Ljosnes	Evaluating the implementation of the Empowering Coaching™ program in Norway
	Tonheim, Milfrid	A troublesome transition: Social reintegration of girl soldiers returning 'home'
	Senneseth, Mette	Improving social network support for partners facing spousal cancer while caring for minors. A randomized controlled trial.
	Urke, Helga Bjørnøy	Child health and child care of very young children in Bolivia, Colombia and Peru.
	Bakhturidze, George	Public Participation in Tobacco Control Policy-making in Georgia
	Fismen, Anne-Siri	Adolescent eating habits. Trends and socio-economic status.
2017 H	Hagatun, Susanne	Internet-based cognitive-behavioural therapy for insomnia. A randomised controlled trial in Norway.
	Eichele, Heike	Electrophysiological Correlates of Performance Monitoring in Children with Tourette Syndrome. A developmental perspective.
	Risan, Ulf Patrick	Accommodating trauma in police interviews. An exploration of rapport in investigative interviews of traumatized victims.
	Sandhåland, Hilde	Safety on board offshore vessels: A study of shipboard factors and situation awareness
	Blågestad, Tone Fidje	Less pain – better sleep and mood? Interrelatedness of pain, sleep and mood in total hip arthroplasty patients
	Kronstad, Morten	Frå skulebenk til deadlines. Korleis nettjournalistar og journaliststudentar lærer, og korleis dei utviklar journalistfagleg kunnskap
	Vedaa, Øystein	Shift work: The importance of sufficient time for rest between shifts.
	Steine, Iris Mulders	Predictors of symptoms outcomes among adult survivors of sexual abuse: The role of abuse characteristics, cumulative childhood maltreatment, genetic variants, and perceived social support.
	Høgheim, Sigve	Making math interesting: An experimental study of interventions to encourage interest in mathematics