The effects of alcohol warning labels on different age groups in the Netherlands

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ABSTRACT
This study explored the effects of alcohol warning labels on different age groups. Respondents (N = 262) were randomized to one of the three warning label conditions (fear appeal, fear appeal + coping or coping). Main outcomes of interest were the attitude, intention and self-efficacy of participants towards drinking less alcohol, after being exposed to a warning label. Furthermore, several (self-reported) impact measures such as the credibility of the warning labels were analysed. Results show that a warning label with a fear appeal message led to significant higher scores on the intention to drink less alcohol in the older age group. A warning label with only a coping message was regarded as the least effective on various outcome measures in both age groups.

Keywords
Alcohol, warning labels, age, fear appeal, EPPM, health.

INTRODUCTION
In the current situation, alcohol can be regarded as the third highest cause of disease and disability in the world (Room, Baboor & Rehm, 2005). In 2012, around 6% of global morbidity and mortality were attributed to harmful alcohol consumption (Martin-Moreno et al., 2013). To be more precise, 3.3 million deaths and 139 million DALYs were attributable to alcohol consumption in 2012 (WHO, 2014)

A burden for all age groups
Globally, the percentage of binge drinking among 15 to 19-year-olds are the highest in high-income countries such as France and the Netherlands (WHO, 2014). Since the brain of adolescents is still developing, excessive drinking behaviour (chronically) impairs the brain resulting in loss of memory function. Furthermore, use of alcohol is related to early drop-out rates and lower school performances (Van Laar et al., 2010). In general alcohol consumption declines with age. However, it is problematic that older people often maintain drinking patterns from their previous life years. This leads to a high burden from unintentional harms such as fall-related injuries (Grundstrom, Guse & Layde, 2012).

Warning labels
Despite the multidimensional burden that is associated with the harmful use of alcohol, reducing the use of alcohol has remained a relatively low priority in health policy worldwide. Especially compared to policy related to other risk behaviours such as smoking (WHO, 2014). What can be learned from cigarette health warning labels is that pictorial warnings have seemed to be more effective than textual warnings in promoting smoking cessation and resulted into more negative attitudes towards smoking (Peters et al., 2007). Negative emotional reactions to warning messages such as fear, have been associated with an increase in the intention to quit smoking (Hammond, Fong, McDonald, Brown & Cameron, 2004).

A few countries have studied the relevance of alcohol warning labels and found differences between age groups. It has been argued by Pettigrew et al. (2014) that people between 18 and 30 years old, tend to find warning statements more believable, convincing and personally relevant. A study in the US concluded that young adults (18 - 29 years old) and heavy drinkers are more likely to recall warning label messages (Stockwell, 2006). Atkin (1995) argued that children's attitudes concerning alcohol become more positive as they grow older. Additionally, Atkin (1995) mentioned that adolescents are less critical of commercial messages than adults and therefore more susceptible to alcohol advertising.

Fear appeal
Fear appeal theories have played a central role in the development of health warning labels. They have been used for years to change attitudes and behaviours on a variety of topics such as cigarette smoking, tuberculosis and dental hygiene (Maloney, Lapinsky & Witte, 2011; Maddux & Rogers, 1983).

The Extended parallel process model (EPPM) is a combination of previous fear appeal theories and clarifies how fear could be used in health messages (Witte, 1992). The model offers predictions about several ways of responding to fear appeal messages such as non-response, danger control response and fear control response. The responses are based on two central concepts: threat and efficacy (Maloney et al., 2011). The model, based on the concepts of threat and efficacy, argues that individuals will first evaluate whether a threat has a high susceptibility and/or high severity. When the level of fear is high, a second appraisal will start which evaluates the efficacy of the coping message. If the perceived threat is high and the level of efficacy is high, individuals will follow danger control processes. In case a threat is perceived as high, but the level of efficacy is perceived as low, individuals will follow the pathway of fear control. If a threat is perceived as irrelevant to the individual, efficacy will not be evaluated and there will be no response (Witte & Allen, 2000).

In contrast to cigarette warning labels, alcohol warning labels have not been focused on a specific harm such as cancer or brain damage. Furthermore, they have not been presented in vivid manners such as cigarette warning labels (Wilkinson & Room, 2009). Therefore, it is important to study the impact of specific warning labels with a fear appeal message and a message which increases someone's self-efficacy (a coping message). Additionally, the effects of warning labels for cigarette and alcohol consumption have mostly been studied separately for adults and adolescents. As mentioned before, the alcohol-related burden of disease among older age groups is concerning Nonetheless, it is concerning that adolescents are at risk for binge drinking and students are more likely to cause harm to themselves and others as binge drinkers (Poelen

et al., 2005; Wechsler et al., 2000). Therefore, it is important to understand whether the effects differ between age groups.

Research questions

In this study, the effects of several vivid fear and coping alcohol warning labels will be analysed among members of the Dutch population. There is special interest in the following research questions:

• Is there a difference between the effects of fear- and/ or coping warning labels on attitude, self-efficacy and the intention towards drinking less alcohol, and are these effects different between age groups?

• Is there a difference between the effects of the warning labels on several self-reported impact measures and are these effects different between age groups?

The following self-reported impact measures will be tested: self-reported credibility, self-reported personal relevance, self-reported change in intention, self-reported induced fear, self-reported perceived response efficacy, self-reported perceived self-efficacy and self-reported defensive behaviour.

• Is there a difference between the effects of the warning labels on the level of public support and is this different between age groups?

• Do the age groups purchase alcoholic beverages at different locations?

METHODS

262 participants from the Netherlands completed an online survey and were randomly allocated to one of the three different warning labels: a fear appeal and coping message (Figure 1) warning label (n = 90), a fear appeal message warning label (n = 89) or a coping message warning label (n = 83). Questions were asked about participants' current drinking behaviour and questions that are related to drinking less alcohol. Additionally, participants´ were asked to rate several statements about the warning label on a ten-point likelihood scale.

The alcohol warning labels tested were: a label with either a fear appeal and coping message (Alcohol causes irreversible brain damage; do not finish your drink all at once, enjoy in moderation), a label with only a fear appeal message (Alcohol causes irreversible brain damage), and a label with only a coping message (Do not finish your drink all at once, enjoy in moderation).

The effects of the warning labels on the participants' attitude, towards drinking less alcohol. Attitude was measured by asking: "To what extent are you positive about drinking less alcohol?" The question was rated on a ten-point scale ranging from 1 (very negative) to 10 (very positive). Similar questions related to self-efficacy and intention were measured with the same scale.

After being exposed to one of the randomized labels, participants were asked to rate several statements on a ten-point scale ranging from 1 (strongly disagree) to 10 (strongly agree). The statements measured (self-reported) impact measures and were previously used in a cigarette health warning label study from Maastricht University. Self-reported credibility of the labels was tested with the statement: "This warning label is credible". Self-reported personal relevance was measured with the statement: "This warning is meant for someone like me".

Data analysis

The results of the survey were analysed with SPSS version 21 for Windows. A Chi-square test ($\alpha = 0.05$) and ANOVA test ($\alpha = 0.05$) were used for attrition analysis to study the demographical characteristics of the participants who did not answer all questions but did finish the first part of the survey (n = 40). After attrition analysis, all participants who did not finish the survey (n = 59) were removed from the dataset, resulting in a final sample size of 262.

Demographic variables such as age, province and education were categorised and re-coded. The variable age was recoded into a new variable (age group) consisting of a younger (17 - 25 years of age) and older (26 years of age and above) age group. The distribution of demographic variables was analysed with a Chi-square test ($\alpha = 0.05$).The means of attitude, intention, self-efficacy and its premeasurements between the three label conditions, were tested with an ANOVA ($\alpha = 0.05$). Additionally, drinking behaviour and self-reported scores on the statements between the label conditions were compared with an ANOVA ($\alpha = 0.05$). The strength of the correlations between demographical and drinking-related variables, the primary outcomes and self-reported statements were tested with Pearson's correlation coefficient ($\alpha = 0.05$).

An ANCOVA with an interaction between the three label conditions and age groups ($\alpha = 0.05$ for main effects and $\alpha = 0.10$ for interactions) was performed for the variables: attitude, intention, self-efficacy and the self-reported scores on the statements. Premeasurements for attitude, intention, self-efficacy and the average alcohol intake in a regular week, were taken into the ANCOVA model as covariates. At last, the dataset was stratified into two age groups for the outcomes that showed a significant interaction between age group and the warning labels. Estimated Marginal Means (EMM) procedure was used to test which groups differed from each other. For the outcome variables that showed no interaction, an ANCOVA ($\alpha = 0.05$) was performed without stratification for age group.

Figure 1: Visualization of the alcohol health warning label with a fear appeal and coping message: Alcohol causes irreversible brain damage; do not finish your drink all at once, enjoy in moderation.

RESULTS

• Attrition analyses showed that a significant difference could be found (F = 4.843, p = 0.029) between the average alcohol intake of the 17 people who did not finish the survey after being presented to a label and the 262 participants who completed the whole survey. The average alcohol intake in the group of people who did not finish the survey (M = 9.9, SD = 9.1) was higher compared to the group of people who finished the survey (M = 6.3, SD = 6.5).

• A majority of the participants (91.2%) were categorized as having a high level of education. However, an ANOVA test showed no significant differences of the distribution of variables between the label conditions and age groups were found.

• Differences were found whilst comparing the locations of purchase of alcohol between the age groups. The younger age group reported to purchase alcoholic beverages more frequently in a pub/bar (M = 3.2, SD = 0.8) compared to the older age group (M = 2.3, SD = 0.9).

• Significance was found for the interaction between age group and the warning label conditions for the primary outcome variable intention (F = 2.972, p = 0.053). The Estimated Marginal Means (EMM) procedure revealed that the fear appeal warning label and the warning label with a fear appeal and coping message showed statistical significance (p = 0.003). The warning label with a fear appeal and coping message (Table 3) scored the lowest (M = 3.3, SD = 2.5) on the primary outcome intention to drink less alcohol and the fear appeal label scored the highest (M = 4.2, SD = 2.9).

• Significant differences between the warning labels were found for the self-reported variables: credibility (F = 9.034, p < 0.001), induced fear (F = 5.268, p = 0.006), change in intention (F = 4.837, p = 0.009) and perceived response efficacy (F = 3.635, p = 0.028). EMM procedure showed that the warning label with only a coping message received the lowest average scores compared to the other warning labels. For example, the warning label with a coping message received an average score of 3.8 (SD = 2.4) in the younger age group and a score of 3.8 (SD = 2.2) in the older age group, for the outcome variable self-reported change in credibility. Whilst the warning label with a fear appeal and coping message received an average score of 5.3 (SD = 2.5) in the younger age group and an average score of 5.1 (SD = 2.8) in the older age group.

• Significant effects for the covariate alcohol were found for the outcome variables: self-reported personal relevance (F = 17.912, p < 0.001), self-reported defensive behaviour (F = 5.400, p = 0.021) and public support (F = 10.763, p = 0.001). Pearson correlations (Table 4) showed that the correlation between alcohol and self-reported personal relevance was positive (r = 0.242), the correlation between alcohol and self-reported defensive behaviour was positive (r = 0.150) and the correlation between alcohol and public support was negative (r = - 0.201). Thus, there might be a relationship between alcohol and these three variables.

• A significant difference between age groups was found for the outcome variable that measured self-reported personal relevance (F = 4.578, p = 0.033). According to the ANOVA results (Table 3), the younger age group reported a higher average score (M = 2.5, SD = 2.6) to the variable self-reported personal relevance compared to the older age group (M = 2.0, SD = 2.3).

DISCUSSION AND CONCLUSION

This study examined the effects of three different alcohol warning labels, between age groups, in a sample of the Dutch population. The alcohol warning labels tested were: a label with either a fear appeal and coping message (Alcohol causes irreversible brain damage; do not finish your drink all at once, enjoy in moderation), a label with only a fear appeal message (Alcohol causes irreversible brain damage), and a label with only a coping message (Do not finish your drink all at once, enjoy in moderation).

The findings indicate that in this study an alcohol warning label with only a fear appeal message is more effective in changing the intention of 26 year olds and above, than the other warning labels. This corresponds with a recent study which argued that people above the age of 43 were more likely to report the influential effects of warning labels on their drinking behaviour than younger participants (Miller, Ramsey, Baratiny & Olver, 2016). On the other hand, this finding contradicts with Atkin's study (1995) which argued that younger people are less critical of commercial messages than adults and therefore more susceptible to alcohol advertising messages.

A warning label with only a coping message was regarded as the least effective on various outcome measures. For example, the warning label that contained only a coping message received a lower score than the other warning labels on self-reported intention towards drinking less alcohol and self-reported credibility of the label. Therefore, it might be concluded from this sample, that using a warning label is perceived as less credible, and is not an effective strategy in increasing someone's self-reported intention towards drinking less alcohol, when no fear appeal is given. This is in line with the Protection Motivation Theory, which argues that people must first believe there is a threat before considering the presented coping message (Neuwirth, Dunwoody & Griffin, 2000; Rogers, 1975).

Additionally, this study indicated possible relationships between alcohol intake of the participants and the following self-reported impact measures: personal relevance, defensive behaviour and public support. Whereas an increase of alcohol intake correlates with an increase of self-reported personal relevance and self-reported defensive behaviour. Alcohol intake correlated negatively with the level of public support. Differences were found between the locations of purchase for the age groups in this study. It can be concluded that in this sample, the older age group preferred to buy most of their alcoholic beverages in the supermarket and in restaurants while the younger age group bought most of their alcoholic beverages in pubs/bars.

There are several limitations of this study to consider. Firstly, because there is a lack of evidence for an effective alcohol warning label, there is the possibility that the labels used in this study are not the most effective ones tested. Future studies should perfom a pilot study of the warning labels first. Furthermore it has to be mentioned that 91% of the study sample could be classified as having a high level of education. Therefore, the results of this study should not be generalized. Future research should incorporate a more diverse study sample and should focus on the effects of fear appeal warning labels. In conclusion, some interesting new insights into the

use of alcohol warning labels in the Netherlands were found in this study.

In conclusion, some interesting new insights into the use of alcohol warning labels were found in this study. According to the results it can be said that health warning labels with only a coping message are not perceived as effective and future research should focus on warning labels with a fear appeal message or a fear appeal with coping message. A warning label with only a fear appeal message seemed to be most effective in influencing the intention to drink less alcohol amongst older participants (26 years and above). Younger participants perceived the warning labels as more personally relevant. Furthermore, the low scores given to the perceived self-efficacy and perceived response-efficacy of the warning labels, indicate that a suitable coping message for alcohol warning labels needs to be found or perhaps no coping message is necessary. Since alcohol usage causes harm to people of all ages, more research is necessary to understand the effects of warning labels on alcoholic beverages and especially the needs of the people at risk.
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ROLE OF THE STUDENT
Claudia de Wilde was an undergraduate student working under the supervision of Gera Nagelhout when the research in this report was performed. The topic was proposed by the supervisor but specified by Claudia and her fellow student Vera Heijnert. The design of the survey and warning labels, the distribution of the survey, processing of the results as well formulation of the conclusions and the writing were done by the students with the help of their supervisor.

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