A LITERATURE OVERVIEW OF THE RELATIONSHIP BETWEEN LIFE-EVENTS AND ALCOHOL USE IN THE GENERAL POPULATION

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Abstract — Aims: A critical review of the evidence of effects of stressful life-events on alcohol use in the general population, with a particular focus on study design. Methods: A literature search in Medline was conducted, covering the period from 1990 to 2005, to identify articles in which the relationship between life-events and alcohol use in the general population (i.e. non-problem drinking population) was investigated. Samples with a limited age range (e.g. college students) were excluded. Twelve studies with a cross-sectional design, and four articles with a longitudinal design were included in this review. Results: Four cross-sectional studies found evidence that experiencing life-events is related to higher alcohol use, three other studies, however, found no such association. The relationship between specific life-events and alcohol use in the five remaining cross-sectional studies is less clear-cut. Being a victim of crime was associated with higher alcohol use, but divorce and financial problems were related to both higher and lower alcohol use. Health-related life-events were found to be associated with lower alcohol use, and life-events related to spouse, friends and relatives, and retiring led to an increase in alcohol use. Conclusions: Evidence points towards a relationship between the occurrence of life-events and alcohol use in the general population. The direction of the effect is, however, not unequivocal. When life-events are operationalized or categorized separately they are not only related to an increased alcohol use but also to a decreased alcohol use. Specification of the model to be tested, including buffering factors such as gender, social support, coping resources, as well as baseline consumption, is important for a correct estimation of the effect of negative life-events.

INTRODUCTION

Tension-reduction is considered to be an important functional reason for people using alcohol (Abbey et al., 1993). Positive expectancies of alcohol use are found to be related positively to alcohol use (Leigh and Stacy, 2004). Obviously, people have positive expectancies concerning the stress-reducing effects of alcohol use, and these positive expectancies are important mediators in the connection between experienced stress and alcohol use (Greeley and Oei, 1999). Because tension-reduction is considered a significant motivational factor and reinforcer of alcohol use, it has played an important role in research on the aetiology of heavy drinking and abuse. In this article, the focus is, however, not on heavy drinking and abuse, but on a review of the relationship between stressful experiences and alcohol use in the general population.

From a tension-reduction point of view, alcohol use is viewed as a means of stress regulation. In their reviews, Greeley and Oei (1999) and Sher (1987) concluded that alcohol has potent stress-dampening or stress-buffering effects. Especially in experimental animal studies, social stressors have been found to be related to alcohol ingestion (Greeley and Oei, 1999). In experimental human studies, results were less clear (Greeley and Oei, 1999). Variation in effects for different types of stressors and large individual differences further diffuse the picture (Johnstone et al., 1997). Sher (1987) confers that more than the direct pharmacological effects, contextual and psychological factors determine the extent in which alcohol use dampens the response to stress. This contention is supported in a review by Pohorecky (1991), who found that both prospective and retrospective studies generally support an effect of stress on alcohol use. In prospective studies, however, this role of stress in alcohol use was clearer among alcoholics. She also concluded that stress appears to play a role in the control of alcohol use by adolescents but not in the use of alcohol in the elderly or among women. She claimed in her review that the tension reduction hypothesis (TRH), which posits that alcohol reduces tension, and people are motivated to use alcohol to reduce tension, was no longer adequate as an overall theory of alcohol use or abuse. It is now generally accepted that the tension-reduction effect of alcohol, is among one of several reinforcers of drinking, although still important. The aim of this article is to review the studies on the relationship between stress and alcohol use, published since 1990.

To investigate this relationship between stress and alcohol use, it is necessary to define the term stress used in this article. As noted above, not all stressors seem to act equally in eliciting a response in the drinker. Stress can be operationalized in different ways. A division can be made in perceived and objective stress, and in chronic and acute stressors. For example, Johnstone et al. (1997) describes four ways of operationalizing stress. First, stress is predominantly measured as negative life-events, which include undesirable happenings such as death of a spouse and loss of employment. Second, it is operationalized as chronic conditions or enduring situations, such as job stress. Third, it is measured as personal emotional distress, such as anxiety and depression. And a fourth way is the operationalization as minor daily irritation or hassles.
The first category, threatening life-events (acute and objective) are among the most potent contextual stressors, and research has focused on the contingent effect of life-events and alcohol abuse, and addiction (Johnstone et al., 1997). In their review, O’Doherty and Davies (1987) concluded that relapses in alcohol-treatment programmes reported a higher negative life-events score compared with non-relapses. For the relationship between life-events and addiction, however, no strong model emerged. They also mentioned the problem of causal interpretation since most studies are cross-sectional in design using retrospective data. Longitudinal designs are better suited for studying the connection between specific life-events and drinking behaviour. Pohorecky (1991), reported in her review that some research does support a positive relationship between life-events and alcohol use and others found no relationship.

Is it possible that moderate drinkers benefit from their drinking? Neff and Husaini (1982) found that among abstainers or heavy drinkers life-events were more strongly related to depressive symptomatology than among moderate drinkers. This result was confirmed by Lipton (1994) who also found that light-to-moderate drinkers experienced less depressive effects of life-events than persons in the non-drinking or heavy drinking categories. The author suggests a possible stress-buffering effect of alcohol use. These studies cannot prove whether alcohol is consumed as an adaptive response to the experience of a negative life-event or whether light-to-moderate drinking is a typical element of individuals who are less sensitive to stress. If, however, alcohol use has a stress-dampening or stress-buffering effect one could argue that moderate drinkers benefit from drinking, in the sense that they are less vulnerable to the negative effects of stress. Psychological stress is generally considered as one of the most important psychosocial risk factors in coronary heart diseases (Tennant, 1999). If moderate drinkers would indeed benefit from their drinking, this could possibly offer an additional explanation for the J-shaped risk relationship between alcohol use and mortality or cardiovascular disease. Studies of the relationship between alcohol use and mortality or cardiovascular disease are mainly based on the general population. In order to shed light on the relationship between life-events and alcohol consumption status, it is necessary to investigate this relationship in the general population.

The purpose of this article is to give an overview of research into the relationship between life-events and alcohol use in the general population, published since the review by Pohorecky (1991). Focus will be on general drinking behaviour (excluding clinical studies focussing on heavy drinking and abuse or dependence), and special attention is given to the design aspect (longitudinal or cross-sectional). Compared with younger people, the risk of cardiovascular diseases is higher for people >45 years of age. With the benefits of drinking as a possible explanation for the J-shaped curve in mind, special interest is shown towards alcohol use in the general population >45 years of age. Main research questions are: 1) Is the occurrence of negative life-events associated with alcohol consumption in the general population? 2) Does the occurrence of a negative life-event lead to an increase in alcohol consumption in the general population?

METHODS

A literature search in Medline was conducted, covering the period from 1990 to 2005. Six articles (Glass et al., 1995; Welte and Mirand, 1995; Brennan et al., 1999; Droomers et al., 1999; Graham and Schmidt, 1999; Jose et al., 2000), in which the relationship between life-events and alcohol use in the general population was studied, were taken as the starting point to decide which key words would be used for the selection of articles for this review. The following key words were used: ‘psychological stress’; ‘life-change-events’; ‘alcohol-drinking/epidemiological’; and ‘alcohol-drinking/psychology’. After combining these key words, the six articles (Glass et al., 1995; Welte and Mirand, 1995; Brennan et al., 1999; Droomers et al., 1999; Graham and Schmidt, 1999; Jose et al., 2000) were still in the search results. Within Medline a language restriction, of Dutch, English, and German was applied. Second, a restriction was made concerning type of population, and only studies with human subjects were allowed.

After combining the key words and the two restrictions, about 200 articles were identified. Although not all articles included research concerning the relationship between life-events and alcohol use in the general population, and for that reason were not relevant for this review, a further selection using additional key words was impossible, without losing one or more of the original six articles (Glass et al., 1995; Welte and Mirand, 1995; Brennan et al., 1999; Droomers et al., 1999; Graham and Schmidt, 1999; Jose et al., 2000). So, all abstracts, and in case of doubt, the full article was screened for relevance. Since the prime question concerns general drinking behaviour, articles describing the relationship between life-events and alcohol abuse, alcoholism, addiction, or drinking problems were excluded. Articles describing experimental studies, and studies with a sample from a limited age range (e.g. college students), or a sample not representative for the general population (e.g. alcoholics) were excluded. The former criterion was also chosen because of the focus on epidemiological studies on stress and cardiovascular disease, and because the risk of cardiovascular diseases is higher for people >45 years of age, predominately samples of middle-aged participants were eventually included. Studies with a wider age distribution, for example from 15 to 74 years were also included. An additional reason why younger samples were excluded from this review is that young people are in their formative years of drinking, and their drinking pattern is still developing, which makes it difficult to interpret the effect of life-events on alcohol use. Finally, 16 articles (Cole et al., 1990; Krause, 1991; Romelsjö et al., 1991; Cooper et al., 1992; Jennison, 1992; Fronet et al., 1994; Glass et al., 1995; Ragland et al., 1995; Welte and Mirand, 1995; Welte, 1998; Brennan et al., 1999; Droomers et al., 1999; Graham and Schmidt, 1999; Jose et al., 2000; Perreira and Sloan, 2001; Dawson et al., 2005) fulfilled all these criteria and were selected for this review.

Information about the sample, life-events measures, and relevant findings concerning the relationship between life-events and alcohol use were extracted from the articles and summarized into two separate tables, one describing the studies with a cross-sectional design, and the other describing the studies with a longitudinal design.
RESULTS

Of the 16 selected studies, 12 were of cross-sectional design described in Table 1, and four were of a longitudinal design described in Table 2. The studies differed in the way alcohol consumption had been measured. Three studies merely assessed drinking status, whether a person was a drinker or an abstainer (Cole et al., 1990; Krause, 1991; Jennison, 1992). One study assessed only quantity of drinking (Ragland et al., 1995), while most others applied a quantity-frequency measure. A single study (Brennan et al., 1999) specified relationships between quantity and frequency of drinking, on the one hand, and different life-events on the other. The variation among the different studies in how alcohol use was measured was too small to make a meaningful distinction between the studies; therefore, the possible effect of how alcohol use was measured on the relationship between life-events and alcohol use will, for that reason, be disregarded in the rest of this article.

Cross-sectional studies

In Table 1, a distinction is made between studies in which total number of life-events was analysed and those in which specific types of life-events were treated separately. Four studies (Cole et al., 1990; Cooper et al., 1992; Frone et al., 1994; Ragland et al., 1995) found a significant association between total number of life-events and increased alcohol use, and three studies (Welte and Mirand, 1995; Droomers et al., 1999; Graham and Schmidt, 1999) found no such relationship. Two studies (Jose et al., 2000; Dawson et al., 2005) investigated both the relationship between total number of life-events and alcohol use, and the relationship between specific life-events and alcohol use. The three remaining cross-sectional studies (Krause, 1991; Jennison, 1992; Welte, 1998) investigated the relationship between specific types of life-events and alcohol use. The five cross-sectional studies (Krause, 1991; Jennison, 1992; Welte, 1998; Jose et al., 2000; Dawson et al., 2005), which looked at the relationship between specific life-events and alcohol use, will be described in the next four paragraphs.

In their study on stressors and alcohol use, Jose et al., (2000) looked at both total number of life-events and specific life-events in relation to alcohol use. They compared light to moderate drinkers, on the one hand, with abstainers and with heavy drinkers, on the other hand. Only in men, total number of life-events was positively associated with heavy drinking. For the specific life-events it was found that being divorced was positively associated with both abstaining and heavy drinking among men. Being a victim of crime and experiencing financial difficulties were positively associated with heavy drinking in men. In women, being divorced was negatively associated with abstaining, having moved was positively associated with abstaining, and experiencing the death of a close relative was negatively associated with heavy drinking.

Dawson et al., (2005) also looked at both total number of life-events and grouped life-events in relation to alcohol use. For the total number of stressful life-events, they found that drinkers experiencing six or more stressful life-events had a higher average daily intake of alcohol and had a higher frequency of heavy drinking, compared with drinkers who did not experience a stressful life-event. For the grouped life-events it was found that, at the bivariate level, health-related life-events were not associated with alcohol use, but social, legal, and job-related stress were significantly associated with alcohol use. At the multivariate model, all stress measures were found to be associated with alcohol use. The direction of the associations between the grouped life-events and alcohol use were as follows: frequency of heavy drinking showed the strongest positive association with stress levels, but frequency of moderate drinking decreased as stress levels increased, except for social stress, which showed an increased frequency of moderate drinking as social stress level increased. The relationship between life-events and alcohol use was found for both men and women, but in the multivariate model a significant interaction between gender and life-events was found, which implies that the effect of life-events on alcohol use was stronger for men. Job-related and legal stress were found to be more strongly associated with alcohol use than were social and health-related stress.

Krause (1991) looked at health problems and financial difficulties in relation to drinking status and found that health problems were positively associated with abstinence. Krause (1991) concluded also that subjective religiosity operated as a coping resource. He found that health problems were related with higher levels of subjective religiosity, which in turn was related to a higher probability of abstinence. Financial difficulties, on the other hand, were related with lower levels of subjective religiosity, implying that people experiencing financial difficulties would be more likely to use alcohol. In the study by Welte and Mirand (1995), no relationship was found between total number of life-events and alcohol use. Welte (1998) performed a more extensive analysis on the same data using four groups of life-events: financial problems, loneliness, poor health, and difficulty with access to the world outside the home. Although the effect sizes were small and explained about 2% or less of total variance, he found that higher stress levels were associated with lower alcohol use.

Jennison (1992) looked at spouse-related events and events related to friends or relatives in relationship to alcohol use. Spouse-related events were operationalized as ‘getting divorced’. The life-events related to friends and relatives were operationalized as ‘relatives being hospitalized’ and ‘relatives becoming unemployed’. These events were found to be positively associated with excessive drinking.

A few studies also investigated factors, which possibly could influence the relationship between life-events and alcohol use. Factors included, for example, expectancies, coping, social support, and education. Droomers et al. (1999) looked at the educational gradient, but found no interaction with life-events and alcohol use. Dawson et al. (2005) checked whether persons with economic or psychological vulnerability were more responsive to stress than those without such vulnerabilities. They found that psychological vulnerability did not modify the association between life-events and alcohol use. With respect to economic vulnerability, results were mixed, there was some evidence that poverty intensified the effects of job stress on alcohol use. Welte and Mirand (1995) found no relationship between life-events and alcohol use, even after controlling for coping style or level of social support. Cooper et al. (1992) found, on the other hand, that
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<td>Cole et al. (1990)</td>
<td>6,747 adult males, employees</td>
<td>Life-events (total number)</td>
<td>Life-events were positively associated with alcohol use</td>
<td>negative association with alcohol use and abuse</td>
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<td>Cooper et al. (1992)</td>
<td>510 men and 806 women (drinking population)</td>
<td>Negative life-events, (total number)</td>
<td>Being male, holding strong positive expectancies for alcohol’s effects, and using avoidant forms of emotion coping, were vulnerability factors High levels of support buffered the relationship between life-events and alcohol use, but exacerbated the relationship between life-events and drinking problems</td>
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<td>Dawson et al. (2005)</td>
<td>13,067 men and 13,879 women (non-institutionalized, adult, and drinking population)</td>
<td>Stressful life-events (total number, and grouped: health-related stress; social stress; job stress; legal stress)</td>
<td>Developmental and public health implications. Negative life-events were positively associated with an increased risk of alcohol use, and high levels of support buffered the relationship between life-events and alcohol use, but exacerbated the relationship between life-events and drinking problems within vulnerable subgroups.</td>
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<td>Droomers et al. (1999)</td>
<td>1,006 men and 756 women (non-institutionalized, general, and drinking population) Aged 25–74 years</td>
<td>Negative life-events, (total number)</td>
<td>No association between life-events and alcohol use</td>
<td>negative association with alcohol use and abuse</td>
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<tr>
<td>Frone et al. (1994)</td>
<td>606 men and 1,001 women Aged 19–65 years</td>
<td>Negative life-events, (total number)</td>
<td>Found an interaction of life-events with gender: negative life-events where more strongly related to alcohol use among men than among women No support that the relationship between life-events and alcohol use is different for people with different educational levels</td>
<td>negative association with alcohol use and abuse</td>
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<td>Study</td>
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<td>Graham and Schmidt (1999)</td>
<td>826 men and women aged 63–96 years</td>
<td>Negative life-events (total number)</td>
<td>Negative life-events were not significantly related to alcohol use</td>
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<td>Jennison (1992)</td>
<td>537 men and 877 women, general population aged 60 years and older</td>
<td>Role losses</td>
<td>Life-events were associated with excessive drinking</td>
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<tr>
<td>Krause (1991)</td>
<td>526 men and 1,081 women aged 60 years and older</td>
<td>Financial difficulty and Health problems</td>
<td>Health problems were directly, and indirectly positively associated with abstinence</td>
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<tr>
<td>Ragland et al. (1995)</td>
<td>1,853 urban transit operators aged 25–65 years</td>
<td>Life-events (total number)</td>
<td>An increase in life-events was associated with both a higher average number of drinks per week as with heavy drinking</td>
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<td>Jose et al. (2000)</td>
<td>3,750 men and women, non-institutionalized, general population aged 15–74 years</td>
<td>Life-events (total number, and specific)</td>
<td>Some life-events were positively associated with abstinence or heavy drinking, and others were negatively associated with abstinence or heavy drinking</td>
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<tr>
<td>Welte and Mirand (1995)</td>
<td>2,325 men and women aged 60 years and older</td>
<td>Stressful life-events (total number)</td>
<td>Life-events were not associated with alcohol use or with current heavy drinking</td>
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<tr>
<td>Welte (1998)</td>
<td>2,325 men and women aged 60 years and older</td>
<td>Stressful life-events Grouped: financial problems, loneliness, poor health, and difficulty with access to the world outside the home</td>
<td>More life-events were associated with less drinking. But the effect sizes were very small</td>
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persons with positive expectancies for the effect of alcohol, and using avoidant forms of emotion coping, were more vulnerable for increased alcohol use after exposure to life-events. Cooper et al. (1992) also found that after exposure to life-events, high levels of support mitigated subjects' increased alcohol use. As described earlier, Krause (1991) found evidence that subjective religiosity functioned as a coping resource, after exposure to health problems. Jennison (1992) found that supportive resources of spouse, family, friends, and church reduced excessive drinking in response to life-events.

**Longitudinal studies**

Results of four studies with a longitudinal design are given in Table 2, and concern only specific types of life-events. Three longitudinal studies investigated health-related life-events in relation to alcohol use and found that health-related life-events were related to a decrease in alcohol use (Glass et al., 1995; Brennan et al., 1999; Perreira and Sloan, 2001). Health-related life-events were operationalized as initial health stressors (Brennan et al., 1999), persons diagnosed with new chronic disease (Perreira and Sloan, 2001), hospitalization (Glass et al., 1995; Perreira and Sloan, 2001), and admission to a nursing home (Glass et al., 1995). Two longitudinal studies looked at the relationship between financial problems and alcohol use (Romelsjö et al., 1991; Brennan et al., 1999), of which one study found a relationship with a decrease in alcohol use (Brennan et al., 1999).

One longitudinal study examined the relationship between retirement and alcohol use, and found that retiring was related with increased alcohol use (Perreira and Sloan, 2001). Two longitudinal studies looked at the relationship between spouse-related life-events and alcohol use. Getting divorced, a spouse-related life-event, was related with an increase in alcohol use (Romelsjö et al., 1991; Perreira and Sloan, 2001). Becoming widowed, another spouse-related life-event, was found to be related with an increase in alcohol use in one study (Perreira and Sloan, 2001). In another study (Romelsjö et al., 1991), no such relationship was found. Two longitudinal studies investigated the relationship between life-events related to friends or relatives and alcohol use (Romelsjö et al., 1991; Glass et al., 1995). These life-events were

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<td>Brennan et al. (1999)</td>
<td>941 men and 621 women, with outpatient contact in past 3 years aged 55–65 years</td>
<td>Negative life-events, health stressors, financial stressors, and spouse stressors</td>
<td>Men: more financial stressors were associated with a decrease in quantity and frequency. Women: more initial health stressors were associated with a decrease in quantity and frequency. More financial stressors were associated with a decrease in frequency.</td>
<td>Life-events were associated with a decrease in alcohol use.</td>
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<td>Glass et al. (1995)</td>
<td>798 men and 1,242 women, non-institutionalized aged 65 years and older</td>
<td>Life-events (specific)</td>
<td>Men: hospitalization and nursing home admission were associated with decrease in alcohol use. Women: losing friend because of move and death of close friend were associated with increase in alcohol use.</td>
<td>Life-events were associated with a decrease in alcohol use, others were associated with an increase.</td>
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<td>Perreira and Sloan (2001)</td>
<td>3,907 men and 3,824 women, aged 51–61 years</td>
<td>Life-events Grouped: health events, employment events, family events</td>
<td>Divorce and retiring associated with increased alcohol use Hospitalization, diagnosed with new chronic condition associated with decreased alcohol use. For problem drinkers, getting divorced was associated with decreased alcohol use. For men becoming widowed associated with increased alcohol use.</td>
<td>Life-events were associated with a decrease in alcohol use, others were associated with an increase.</td>
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<td>Romelsjö et al. (1991)</td>
<td>2,152 men and 2,682 women, non-institutionalized aged 22 years and older</td>
<td>Life-events (specific)</td>
<td>Divorce was associated with increased alcohol use.</td>
<td>Only divorce was associated with an increase in alcohol use.</td>
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operationalized as losing a friend because of a move (Glass et al., 1995), death of a close friend (Glass et al., 1995), and relatives being hospitalized (Romelsjö et al., 1991). One study (Glass et al., 1995) found that these respective life-events were related with an increase in alcohol use. The second study (Romelsjö et al., 1991) did not find an increase in alcohol use after the death of a close friend.

The observation period and the outcome measures of the four longitudinal studies differed. Brennan et al. (1999) had an observation period of 4 years and measured exposure to negative life-events and drinking behaviour three times: baseline, 1 year later and 4 years later. They found that the strength of the relationship between life-events and alcohol use was strongest over T1–T2 (1 year) interval, less strong over T1–T2 (3 year) interval, and least strong over T1–T3 (4 year) interval. They conducted a LISREL analysis, accounting for previous drinking behaviour. Glass et al. (1995) had a baseline measure, and a follow-up measurement 3 years later. Alcohol use measured at follow-up was the dependent variable, and alcohol use measured at baseline was added as a covariate in the analysis. They also found a significant interaction between baseline alcohol use and life-events, indicating that the effects found are stronger among those who drink more at baseline. Perreira and Sloan (2001) had four waves with a 2 year interval. They modelled change in alcohol use over the entire 6 year of follow-up. But they also looked at the relationship between life-events experienced between waves 1 and 2, 2 and 3, and 3 and 4, and change in alcohol use between waves 3 and 4, to test whether associations between life-events and alcohol use became weaker as time following events lapsed. They found that for hospitalization, alcohol use decreased around the time of the event and rebounded subsequently, but for retirement they observed an increase in the same 2 year period in which the person retired, and also in the period after that. Romelsjö et al. (1991) had an observation period of 9 years and modelled change in alcohol use by subtracting the baseline measure from the follow-up measurement 9 years later.

The above results all concern the effects of life-events on subsequent alcohol use. Brennan et al. (1999), however, also looked at the reverse, the effects of alcohol use on life-events. They found, that for women a higher frequency of alcohol use was associated with fewer life-events, fewer health stressors, and also with fewer financial stressors. For men, they found that a higher frequency of alcohol use was associated with fewer health stressors.

Three of the longitudinal studies also controlled for factors that possibly could influence the relationship between life-events and alcohol use. Perreira and Sloan (2001), for example, controlled for social support, self-rated coping skills, and socio-demographic characteristics. As mentioned earlier, Glass et al. (1995) found an interaction between baseline alcohol use and life-events, but they also controlled for, for example, demographic variables and social network size. And finally, Romelsjö et al. (1991) adjusted for demographic variables, health status, and psychosocial factors (e.g. social isolation, and depression). All three studies controlled for the factors described above, but they did not provide information whether or to what extent these variables modified the relationship between life-events and alcohol use.

In summary, of the 12 cross-sectional studies, four studies found evidence that higher stress levels are related to higher alcohol use. Three studies, however, found no such association. The relationship between specific types of life-events and alcohol use is less clear-cut. Specific types of life-events are not only related with higher alcohol use, but also with lower alcohol use. Being a victim of crime, for example, was associated with higher alcohol use, but divorce and financial problems were related with both higher and lower alcohol use, and health problems were found to be related with lower alcohol use. In studies with a longitudinal design this differences in effect of specific life-events on alcohol use is even clearer. Health-related life-events and financial problems precede a decrease in alcohol use, whereas life-events related to spouse, friends and relatives, and retiring seem to cause an increase in alcohol use.

In this review, it becomes apparent that effects of negative life-events may cancel each other out when combined in a summarized measure. As described above, reaction to one event may be towards heavier drinking, when other events may evoke a decline in drinking. Except in the study by Dawson et al. (2005) who found that both total number of life-events and the grouped life-events were associated with a higher frequency of heavy drinking. But they also found that job-related and legal stress were more strongly associated with alcohol use than were social and health-related stress. The difference in total versus specific types of life-events is most evident in the two studies from Welte and Mirand (1995), and Welte (1998), in which different analyses were performed on the same sample. When they used total number of life-events, they found no relationship between life-events and alcohol use. In the second study, Welte (1998) analysed the same data, but this time he grouped the life-events into four categories. In this second study, life-events were related to lower alcohol use, although the effect sizes were small. This difference in the effect on alcohol use between total number of life-events and specific life-events was also found in the study by Jose et al. (2000). When looking at the total number of life-events, they only found a positive association with heavy drinking in men. When considering specific life-events, they found that some life-events (for example, being a victim of crime) were related with higher alcohol use, and others (for example, death of a close relative) with lower alcohol use. It can be hypothesized from this review that, results from studies into the relationship between total number of life-events and alcohol use may be biased.

The review reveals that the impact of life-events on alcohol use may be different for men and women. Dawson et al. (2005) and Frone et al. (1994) found an interaction between life-events and gender, which implied that the effect of life-events on alcohol use was stronger for the male gender. It becomes apparent from the reviewed studies that men and women differ in their exposure to life-events, both in type and frequency. For example, Conger et al. (1993) found that men reported more difficulties in life areas related to work and personal finances, whereas women reported more life-events in their social network. The two genders also seem to differ in the way they express distress. Glass et al. (1995) found, for example, that spouse-specific events were more...
likely to influence alcohol use in men. Probably, men tend to express their distress by alcohol or drug use, while women, on the other hand, express their distress more with symptoms of depression and anxiety. Abbey \textit{et al.} (1993) found that reasons for drinking alcohol also differ between men and women. Coping and social motives for drinking seem to be more important for men than for women.

The above review lends support to the idea that stressful life-events have an impact on drinking, and that this effect may be buffered by a third factor. The buffering hypothesis posits that the impact of life-events on alcohol use may be different if resources for dealing with stress (e.g. coping, social support, or religiosity) are available. Persons having less social support might use alcohol to relieve their stress after experiencing a negative life-event, whereas those with ample social resources would be less likely to use alcohol in such an instrumental way. Also other factors might bias the reported effects of life-events on alcohol use. For example, health-related life-events were found to be related to a decrease in alcohol use (Glass \textit{et al.}, 1995; Brennan \textit{et al.}, 1999; Perreira and Sloan, 2001). This could be explained by factors other than the buffering hypothesis, for example, alcohol might exacerbate a health problem or a person is advised by a physician to drink less. And in the case of hospitalization, restrictions on the availability of alcoholic drinks might explain the decrease in alcohol use. To complicate matters further, one has to consider the possibility that the effects of life-events on subsequent drinking or changes in drinking may be dependent on the drinking level of the person experiencing these events. This implies an interaction effect, as was reported by Glass \textit{et al.} (1995). They found that the impact of life-events was dependent upon baseline drinking. Heavy drinkers showed a larger (proportional) decrease in consumption in response to health-related life-events and a smaller (proportional) decrease in reaction to life-events related to spouse, friends, or relatives. The interactions of the impact of life-event with baseline consumption in the Glass \textit{et al.} (1995) study underscores the necessity for a careful specification of variables in a comprehensive model to be tested.

A last issue addressed here concerns the direction of effect. It may be contended that heavy drinking itself may inflict negative life experiences in the drinker. In the reviewed studies, the study by Brennan \textit{et al.} (1999) looked specifically at the effects of alcohol use on life-events. Contrary to expectations, they found that a higher frequency of alcohol use was associated with fewer life-events. The direction of effect, and temporal fluctuations in the relationship between life-events and alcohol use, can of course not be detected using a cross-sectional design. As recommended by O’Doherty and Davies (1987) and Pohorecky (1991) disentangling possible reciprocal effects require carefully designed longitudinal studies. In this respect, the time window between the measurement of life-events and alcohol use is essential. For example, hospitalization (Glass \textit{et al.}, 1995; Perreira and Sloan, 2001) and nursing home admission (Glass \textit{et al.}, 1995; Perreira and Sloan, 2001) were found to be associated with a decline in alcohol use. Perreira and Sloan (2001) found in their study that drinking indeed decreases after hospitalization, but rebounds subsequently. Brennan \textit{et al.} (1999) found that the relationship between life-events and alcohol use was strongest over the 1 year interval, and became weaker as ‘time after experiencing a life-event’ becomes larger. It could be hypothesized that the effect of life-events on alcohol use might disappear after a while. This could explain why, for example, Romelsjö \textit{et al.} (1991) only found a relationship between divorce and an increase in alcohol use, and the effects of the other life-events measured in this study had disappeared at the follow-up 9 years later. This underlines the importance of the timing of follow-up measurements, i.e. this choice seems to determine the outcome.

In conclusion, evidence shows that life-events affect alcohol use, particularly when these events are operationalized separately or categorized. At a single point in time, people who have experienced health-related life-events in the near past tend to have a lower alcohol use, while crime victims tend to show higher levels. When looking prospectively, health-related life-events and financial problems precede a decrease in consumption, and negative events occurring in spouse, friends, or relatives, and retirement seem to lead to an increase in alcohol use. Specification of the model to be tested, including buffering factors such as gender, social support, coping resources, as well as baseline consumption, seem important for a correct estimation of the effect of negative life-events.

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