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Smoking and Absence from Work

A Quantitative Review

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Absenteeism continues to be one of the most costly problems facing organizations today. For many years estimates of the cost of absenteeism in North America have exceeded $25 billion annually (e.g., Steers & Rhodes, 1978) and, perhaps not surprisingly, researchers have focused considerable attention on the identification of the causes of workplace absenteeism. As noted by Hackett, Bycio, and Guion (1989), three perspectives have largely driven organizational research on absenteeism. Absence has been seen as a means of avoiding negative aspects of the job, a rational decision or choice process, and as a result of socialization and job demands.

One consistent focus of attention in the research literature has been the hypothesized link between work attitudes (e.g., job satisfaction) and absenteeism. Hackett (1989) reviewed three meta-analyses of this relationship and concluded that there was consistent evidence for a modest correlation between absence frequency and work satisfaction ($r = -.21$) as well as between absence duration and overall job satisfaction ($r = -.23$).

Although these data are consistent, the observed relationship is small in magnitude suggesting that either (1) work attitudes are only a minor influence on absenteeism or (2) other factors plausibly affect absenteeism

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rates and result in lessening the magnitude of the observed attitude–absence correlation (Johns, 1991). In this chapter we turn our attention to the latter suggestion. Specifically, we present data suggesting a link between employee lifestyle behaviors (i.e., cigarette smoking) and workplace absence.

One of the major social questions in recent years has been the effect of cigarette smoking on individual health and well-being. Sufficient data have now been accumulated to conclude that smoking does exert adverse health consequences (Bush & Wooden, 1995), especially increased risks for coronary heart disease and cancer. Moreover, smokers are more likely than nonsmokers to experience less severe ailments such as upper respiratory tract infections (Bush & Wooden, 1995; Henningfield et al., 1994). The association between smoking and ill health begs the question of whether there are other "hidden" costs associated with cigarette smoking; "hidden" in that the impact of smoking on outcomes other than physical ailments has to date received comparatively less attention.

The purpose of our study was to investigate one such potential cost, namely, whether tobacco smokers are disproportionately more likely to be absent from work than are nonsmokers. The basis for this question lies in the observation that smokers are less healthy than nonsmokers (Henningfield et al., 1994) leading to the suggestion that smokers' attendance at work will be negatively affected. Certainly there are numerous references in the medical and human resource literatures suggesting an association between smoking and absenteeism. However, close inspection of this literature suggests that there is considerably more discussion about this possible association then there are data supporting such a link. In other words, the literature is currently driven more by rhetoric than by empirical data. In addition, studies that do contain empirical data vary markedly in quality. Therefore, the primary purpose of our study was to statistically summarize the empirical data linking smoking and absenteeism. In doing so, we empirically integrate findings from numerous studies to provide an estimate of the effect of smoking on absenteeism.

Second, a cursory inspection of the empirical literature on smoking and absenteeism suggests that this question has drawn the attention of researchers from many countries (e.g., Germany, Sweden, Poland, Chine, Israel, Australia, the United States, the United Kingdom, and New Zealand). Many of these countries differ from one another in terms of both their "smoking culture" (e.g., public policy, attitudes, and legislation regarding cigarette smoking) and workplace structures (including workplace policies regarding absenteeism). Accordingly, we also address whether the magnitude of the association between smoking and absenteeism varies across studies.

Third, assuming that a reliable association exists between smoking and absenteeism, the question of whether quitting smoking results in a decrease in absenteeism assumes considerable importance (Bush & Wooden, 1995; Wooden & Bush, 1995). Certainly, quitting smoking has beneficial effects on medical outcomes including the reversal of some adverse smoking-related conditions. Thus, because we believe that the intervening variable between smoking and absence is ill health, it is reasonable to suggest that smoking cessation results in decreased absenteeism.

To summarize, we present an empirical or quantitative study of the relationship between smoking and absenteeism. In doing so we address three specific research questions. First, is smoking associated with increased absenteeism and, if so, what is the magnitude of this effect? Second, does the magnitude of the effect vary according to the country in which the data were collected? Finally, is smoking cessation associated with a decrease in absence from work.

METHOD

Database

For a quantitative analysis to provide an accurate estimate of a relationship, it is critical that all available data be collected and analyzed. To ensure that we collected as many studies on the relationship between smoking and absenteeism as were obtainable, we conducted computerized searches of several databases, namely, Medline Medical Index, American Business Index, Psychological Information Database, Social Sciences Index, and Humanities Index. All studies purporting to provide data on smoking and absenteeism were obtained. This included several articles in languages other than English (e.g., German, Japanese, Afrikaans) which were translated into English. Numerous articles that purported to obtain data on the relationship of interest but did not contain any empirical data were also located. Because discussions on the link between smoking and absenteeism frequently refer to the large database available, a bibliography of these studies is available from the second author on request. The articles that did produce usable data are presented in Table 1.

Measures

In order to combine results across studies, it was necessary first to develop common operationalizations of both cigarette smoking and

Table 1. Descriptive Information for the 25 Studies Providing Complete Data

Authors	Year	Country	Data year	*N* smokers	Smoker absence	*N* nonsmokers	Nonsmoker absence
Anderson & Malmgren	1986	Sweden	1975	369	22.5	556	18.85
Athansou	1979	Australia	1978	205	18.71	219	10.79
Batenburg & Reinkein	1990	New Zealand	1988	337	6.18	555	5.51
Bertera	1991	USA	1988	13,060	3.69	32,916	2.79
Carmichael & Cocker	1990	UK	1988	99	7	79	4
Fawer et al.	1982	UK	1979	26	2.6	12	1.65
Foerster et al.	1976	Germany	1975	110	28.5	55	15.8
Gabel & Colley-Niemeyer	1990	USA	1987	194	13.48	590	10.87
Gallop	1989	New Zealand	1988	20	10.3	33	7.9
Green et al.	1992	Israel	1987	2,067	10.99	3,759	10.3
Hawker & Holtby	1988	UK	1987	40	4.63	121	3.39
Hayden et al.	1984	UK	1983	277	28.5	239	15
Hendrix et al.	1991	USA	1986	97	6.4	366	5.8
Holcomb & Meiggs	1972	USA	1964	114	6.9	29	4.3
Janzon et al.	1981	Sweden	1978	517	13	230	4
Kark et al.	1982	USA	1981	186	1.36	163	0.91
Kozak	1987	Czech	1984	373	25.9	250	28.1
Lowe	1960	UK	1957	2,284	6.57	1,057	5.49
Manning et al.	1989	USA	1984	96	5.74	206	3.95
Marti	1986	Germany	1984	299	3.57	3,660	2.1
McMillan	1981	UK	1979	1,962	5.58	929	4.11
Qun & Dobson	1992	China	1987	1,479	0.39	377	0.27
Ryan et al.	1992	USA	1989	825	12.96	1,712	9.84
Smith et al.	1981	Australia	1980	226	2.94	479	2.11
Tsai et al.	1990	Sweden	1986	2,388	7.79	4,609	5.12

absence from work. Studies varied considerably in their measurement of smoking behavior. For example, some authors defined the smoking group as individuals who reported smoking any amount of tobacco. Other researchers limited the group of smokers to those who smoked specific amounts (e.g., 15 cigarettes/day). Some researchers provided breakdowns of smoking intensity, dividing smokers into "heavy," "light," or "occasional" smokers, often based on different criteria across studies. Finally, some authors differentiated between pipe, cigar, and cigarette smokers while others did not. In order to retain the maximum amount of data in the analysis, we used the lowest common denominator in defining smokers as individuals who currently (i.e., at the time of the original study) reported smoking any number of cigarettes. In cases where the group of smokers was defined by the minimum daily amount of smoking

and the original researchers did not provide additional information, we used the original author's definition of smoking.

Similarly, individual studies varied widely in their reporting of absenteeism statistics. Some studies reported absence in terms of hours per month, others in terms of days per year. In all articles used in the current analysis, sufficient information was presented to allow the calculation of absenteeism as days lost per year. In converting absenteeism figures from hours to days we followed the frequently used definition of a workday as $7\frac{1}{2}$ hours.

Method of Data Analysis

To be included in the current analysis, articles had to report absenteeism figures for, and the number of, both smokers and nonsmokers. Our task was then to cumulate these findings across studies to provide an estimate of the effects of smoking on absenteeism. In cumulating findings across studies we followed the common meta-analytic practice (Hunter, Schmidt, & Jackson, 1982) in choosing to use a weighted rather than a simple average.[1] Thus, absenteeism data for smokers and nonsmokers were weighted by the sample size in each group. This procedure gives greater weight to findings derived from large studies and less weight to findings based on smaller samples. This is important because it well established that large-sample estimates are more precise than are estimates based on small samples.

After deriving a weighted absenteeism figure for both smokers and nonsmokers in each study, we then cumulated the measures across studies and divided by the total number for smokers (or nonsmokers as appropriate). The end of this procedure was a single absenteeism figure for all smokers across all studies and a comparable average for nonsmokers. These averages were then used in further analyses.

RESULTS

Is Smoking Associated with Absence from Work?

Twenty-five studies provided sufficient data to compare the absenteeism rates of smokers and nonsmokers. Descriptive information

[1] Ideally one would also derive an estimate of sampling error and be able to correct for study artifacts (e.g., restriction in range, measurement error). Unfortunately, the data available to us did not allow for such corrections—there were insufficient data reported to allow us to estimate these effects nor were sufficient data available to allow the estimation of artifact distributions.

from these studies is presented in Table 1. Absenteeism among smokers ($M = 6.37$ days per year, $N = 27{,}650$) was significantly higher than was absenteeism among nonsmokers ($M = 4.29$ days per year, $N = 53{,}201$), $t\,(242) = 3.31$, $p < .005$. Thus, smokers missed 2.07 more days of work each year than did nonsmokers. Stated somewhat differently, there was a 48.25% increase in absenteeism associated with smoking.

Does the Size of the Effect of Smoking on Absenteeism Vary by Country?

To investigate this question, we initially combined data within five geographically similar areas (Australia/New Zealand; Czechoslovakia, Poland, and Germany; Finland and Sweden; the United Kingdom; and the United States). A sixth residual category comprising one study from China and one study from Israel was also formed. The difference in absenteeism between smokers and nonsmokers in each region is presented in Table 2.

Overall there were no statistically significant differences in absence from work as a function of smoking across geographical groups. That is, although there are differences in the mean level of absenteeism in different geographic regions, the difference between smokers' and nonsmokers' absenteeism did not differ significantly across region. Alternative ways of combining the data (e.g., USA versus all other countries; European countries versus all others) also resulted in no statistically significant differences between groups. Thus, the strength of the effect of tobacco smoking on absence from work was deemed to be stable across countries.

Does Smoking Cessation Affect Absence from Work?

Of the original 25 studies that we located, 8 presented data on former smokers and allowed for comparison of absenteeism rates among current

Table 2. Annual Average Absenteeism of Smokers and Nonsmokers by Geographic Region

Region	Smokers	Nonsmokers
Australia/New Zealand	9.53	6.58
Germany/Poland/Czechoslovakia	19.32	15.33
Sweden/Finland	14.43	9.32
United Kingdom	9.15	5.61
United States	7.10	5.69
China/Israel	5.69	5.29

Note. No Significant differences between regions were observed.

Table 3. Annual Absenteeism of Current and Former Smokers

Authors	Year	Country	Data year	*N* smokers	Smoker absence	*N* nonsmokers	Nonsmoker absence
Gabel & Colley-Niemeyer	1990	USA	1987	194	13.48	210	11.39
Gallop	1989	New Zealand	1988	20	10.30	29	9.10
Holcomb & Meiggs	1972	USA	1964	114	6.90	44	6.18
Jackson et al.	1989	USA	1986	35	41	35	30
Janzon et al.	1981	Sweden	1978	517	13	290	7
Manning et al.	1989	USA	1984	96	5.74	96	3.44
McMillan	1981	UK	1979	1962	5.58	686	4.21
Tsai et al.	1990	Sweden	1986	2388	7.79	866	7.19
			Mean		7.84		6.87

smokers, former smokers, and nonsmokers. Descriptions of these studies are presented in Table 3.

Former smokers exhibited less absenteeism ($M = 6.87$, $N = 2246$) than did current smokers ($M = 7.84$, $N = 5326$) although this difference was not statistically significant ($p > .05$). Former smokers also exhibited more absenteeism than did nonsmokers ($M = 5.43$, $N = 6626$) although again this difference was not statistically significant.

DISCUSSION

The primary purpose of our investigation was to investigate the existence and size of an association between cigarette smoking and absence from work by cumulating results gleaned from almost 40 years of published empirical research on this question. Our results strongly support the existence of such an association with smokers being absent 2.07 days per year more than nonsmokers; an increase of 48%. These results point to the substantial organizational costs of smoking.

Two potential moderators of the smoking absenteeism relationship were also investigated. First, we found that the size of the effects reported in the literature did not vary according to where the data were collected. Consequently, any effects of tobacco smoking on absence from work may be considered to be stable across countries despite national/cultural differences in smoking and absenteeism patterns. Second, a limited number of studies reported data on former smokers in addition to data from smokers and nonsmokers. This allowed us to assess the potential

effects of smoking cessation on absence. Although we did observe that former smokers had a lower absenteeism rate than current smokers (0.97 day/year), the difference was not statistically significant. However, given the small number of studies providing complete information on smoking cessation, it is possible that insufficient data, and the resultant loss of power, accounted for the lack of a statistically significant finding.

Given that our strategy was to summarize and cumulate empirical findings from a number of studies, our conclusions are potentially limited by several observations.

First, the data that were used in our study were the direct comparison of absenteeism between groups of smokers and nonsmokers. While it is convenient to summarize these data as suggesting the "effects" of smoking on absenteeism, it should be noted that this phrasing implies a causal inference that is not justified by the data. Most of the studies we reviewed were cross-sectional, observational studies and therefore allowed the possibility of reverse causality or "third-variable" effects.

For example, Ault, Ekelund, Jackson, Saba, and Saurman (1991) conducted a multivariate analysis and concluded that the association between smoking and absenteeism was attributable to smokers being more likely to be younger, moderate to heavy drinkers, blue-collar workers, and to have shorter tenure in the workplace—factors also associated with higher levels of absenteeism. Subsequent research that also implemented statistical controls (e.g., Bush & Wooden, 1995) provided conflicting findings in which the association between smoking and absenteeism remained after controlling for a host of demographic, health, and lifestyle-related variables. Clearly, quasi-experimental, experimental, and longitudinal data implementing controls over a wealth of potentially confounding variables (e.g., lifestyle factors, health status) are required in order to justify this implied causal inference.

Ironically, when such multivariate analyses have been conducted, researchers have chosen to report the multivariate estimates (e.g., logistic regression weights; Bush & Wooden, 1995) rather than the bivariate estimates (e.g., mean differences) as in the earlier research. This reporting strategy causes some difficulty for researchers wishing to cumulate results across studies. The difficulty emerges from the fact that multivariate effects such as regression weights cannot be cumulated across studies (Hunter et al., 1982). While such analyses are clearly required to estimate the unique effect of smoking on absenteeism, there also remains a need for reporting at the level of bivariate relationships.

Second, in deriving common measures of smoking and absence across studies, considerable information is sacrificed. In particular, quantitative measures of smoking intensity (e.g., number of cigarettes smoked

per day) were frequently dichotomized to form groups of smokers and nonsmokers. While this procedure allowed the comparison of results across diverse studies, it also resulted in the loss of more precise measures. We suspect that this practice may have resulted in an *underestimate* of the effect due to the loss of variance resulting from dichotomizing a continuous variable.

Third, most of the source articles did not report complete descriptive statistics for measures of absenteeism. In particular, measures of within-group variance were not available. This is a particularly important omission because it prohibits the correction for sampling error that allows precise population estimates to be derived from meta-analytic procedures (Hunter et al., 1982). In the current case we could cumulate the means but have no information regarding the extent to which these "average" results vary across studies.

Similarly, it should be noted that the studies contributing data to our analyses focused on only full-day absenteeism (e.g., the use of "sick days"). However, smoking is also associated with partial absence (i.e., taking cigarette breaks during the day) which can also result in significant organizational costs. Greenberg, Finkelstein, and Berndt (1995) estimate that such breaks constitute a loss of 3.125% of working time. Assuming that 20% of the work force smokes, the value of this lost productive time is estimated to approach $17 billion, U.S. each year (Greenberg et al., 1995). The lost time attributable to partial absence (i.e., approximately 8 days/year) may be substantially higher than the effect of smoking on full-day absence that has been the focus of most empirical research.

The importance of considering partial absenteeism is highlighted by the observation that Greenberg and co-workers' (1995) estimate is based on smokers accruing 15 minutes each day in partial absenteeism. We suggest that this estimate is substantially lower than the actual amount of time lost by smokers during the day and that doubling, or even tripling, this estimate would not be unreasonable. Moreover, regional differences in smoking patterns may make the estimate of smoking prevalence (i.e., 20% of the work force) a very conservative assumption.

Likewise, the quality of data reporting on smoking was frequently questionable. Researchers who have addressed the link between smoking and absence have largely ignored variables such as the length of time individuals had been smokers, why former smokers might have quit smoking (e.g., ill health or the choice of a more healthy lifestyle), and a host of other descriptors. Again this results in a very conservative assessment of the effects of both smoking and smoking cessation on absenteeism and research in these areas would be greatly enhanced if greater attention would be paid to the measurement and reporting of smoking

behavior. Indeed, in evaluating the effects of smoking cessation on absenteeism, Wooden and Bush (1995) observed that absenteeism declines as a function of the number of years as an ex-smoker, little effect being observed in the first year.

In conclusion, the available data support the conclusion that cigarette smoking is associated with increased absenteeism from work. Smokers reported approximately 48% more absenteeism from work than did nonsmokers. Moreover, the magnitude of this effect was stable across countries. In addition, some empirical data suggest that smoking cessation may be associated with decreased absenteeism. Taken together these findings suggest that there are significant organizational costs associated with cigarette smoking and that organizations may be able to avoid these costs by supporting smoking cessation and similar lifestyle programs.

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