

ORIGINAL ARTICLE OPEN ACCESS

Does Proactivity Affect Insurance Solidarity and Individual Responsibility?

Alberto Cevolini¹  | Elena Esposito² 

¹University of Modena and Reggio Emilia, University of Bologna, Bologna, Italy | ²University of Bielefeld, University of Bologna, Bologna, Italy

Correspondence: Alberto Cevolini (alberto.cevolini@unimore.it; alberto.cevolini2@unibo.it)

Received: 8 May 2025 | **Revised:** 8 May 2025 | **Accepted:** 14 May 2025

Funding: This study was supported by H2020 European Research Council (Grants 833749).

Keywords: behavioural insurance | insurance solidarity | personalised prediction | prevention | proactivity | responsibility

ABSTRACT

Over the past 20 years, the insurance industry has been experimenting with technological innovations that deeply affect its business model and social function. This article explores the use of digital technologies to monitor policyholders' behaviour and personalise their insurance coverage. Information extracted from behavioural data can be used to produce individualised predictions and design proactive insurance policies, which aim to prompt policyholders to act on the possibility of future damages before they happen. This innovation could bring many benefits in terms of efficiency (improving loss ratio) and foresight (improving risk assessment), but also a renewed focus on individual responsibility for losses. As a consequence, we argue, the collective management of future uncertainty could be undermined, jeopardising the insurance solidarity that makes mutual protection viable.

1 | Introduction

Over the last 20 years, the insurance industry has been experimenting with technical innovations whose impact is still unpredictable but could deeply change the business model and social function of insurance.¹ The key innovation is the co-optation of digital technologies originally developed for other purposes and now used by many insurance companies to track and monitor policyholders' behaviour.² These monitoring technologies produce so-called 'behavioural' data that can be used to implement an individual risk assessment and, at least in principle, adjust the policy premium accordingly.

Our contribution investigates the impact of these innovations on the structures of insurance and its function for society as a whole. In particular, we focus on the relationship between insurance *solidarity* and individual *responsibility*. For insurance, the aim of experimenting with digital technologies is to achieve

benefits in terms of efficiency (enhancing the loss ratio) and foresight (improving risk assessment). However, if the role of insurance is to enable a shared management of future uncertainty and to protect policyholders against losses, recent innovations risk undermining the sense of solidarity that makes this protection viable. Personalisation of insurance and solidarity are not easy to combine, especially if—as we shall see—the use of behavioural data in insurance practice seems to lead to a renewed focus on individual responsibility for losses.

Experimentation is most advanced in two insurance lines: Third-party liability motor insurance and health & life insurance. In motor insurance, a black box installed in the car or an app uploaded on the mobile phone detects the policyholders' *driving style* (how they brake, how they accelerate, whether they exceed the speed limit, etc.). In health & life insurance, a tracking device such as a FitBit watch or a fitness app uploaded on the mobile phone detects the policyholders' *lifestyle* (how

This article is part of the Special Issue: Insurance and Social Theory.

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2025 The Author(s). *The British Journal of Sociology* published by John Wiley & Sons Ltd on behalf of London School of Economics and Political Science.

many steps they walk each day, how many hours they sleep, etc.). These behavioural features, usually translated into scores, are monitored by insurance companies: A high score means you behave well, a low score means you behave unsafely. Policyholders with high scores usually receive financial rewards—vouchers, several forms of discounts, cashback. Policyholders with low scores do not receive financial rewards, but their premium is not increased, except where national regulation allows underwriting.

The use of behavioural data for insurance purposes is expected to be a game-changer. Of course, insurance has always been greedy for data (Swedloff 2014, 341). Data enables the calculation of statistical regularities, which are essential for deriving risk profiles, determining loss expectation, and setting the policy premium (Hacking 1975; Daston 1983; Porter 1986; Daston 1987; Hacking 1990; Desrosières 2010). Traditionally, however, actuarial mathematicians could only draw on non-behavioural data, such as gender, age, occupation, residence, etc. Today digital technologies make it possible to track individual behaviour, offering insurers not only a huge amount of additional data, but also data of a different kind that can be used in innovative ways.

As behavioural data are by definition individual data, risk assessment can be personalised.³ From behavioural data, insurance companies can extract a lot of information with predictive value, because the features monitored by digital devices correlate with future claims (Denuit et al. 2019; Vitality & London School of Economics 2024). The ongoing experimentations are thus led by the idea that by processing data with sophisticated digital techniques insurance companies can predict the risk exposure of each policyholder in a more accurate, comprehensive and reliable way than with traditional actuarial techniques—and above all, in a way that is tailored to the individual customer (Cevolini and Esposito 2022). In addition, this could lead to some mitigation of adverse selection, as it would encourage less risky policyholders (e.g., people who drive only few days a month, or young and healthy customers who love exercising) to take out behavioural data-based insurance policies.

In Section 2, we examine the shift in the approach of insurance towards proaction that results from the ability to predict individual claims: instead of intervening to compensate for a loss after an incident has occurred, insurance is trying to work in advance to mitigate its occurrence, prompting single policyholders to change their behaviour in targeted ways. The benefits of this form of proactivity, however, go along with tricky issues related to the social function of insurance, in particular the relationship between responsibility and solidarity, which we address in Section 3. Section 4 discusses the possibility that the use of behavioural data may undermine the collective management of future uncertainty introduced, in modern society, by the institution of insurance. In the conclusions, we wrap up our analysis and discuss obstacles and future prospects underlying the use of behavioural data in proactive digital insurance.

Our work is based on empirical research on the use of behavioural data in pay-how-you-drive (PHYD) and pay-as-you-live (PAYL) insurance policies, supplemented with intensive analysis of the relevant literature and the documents produced by

insurance companies. Over the course of 4 years, we investigated the experimentations with innovative proactive insurance programs by private insurance companies and public sickness funds in several European and non-European countries. The first part of our empirical research is based on eight semi-structured interviews conducted between autumn 2020 and spring 2021, and on the analysis of a dataset provided by an insurance company selling a telematic motor insurance policy (Cevolini and Esposito 2022; Cevolini and et al. 2025). The second part is based on twelve semi-structured interviews with professionals working for private insurance companies, public sickness funds, and software providers, carried out between June 2023 and April 2024.

2 | Proactive Risk Mitigation Through Behavioural Data

What can insurance do with individualised forecasts?

Initially, insurance companies were thrilled to offer personalised insurance coverage. Their assumption was that, by processing behavioural data, they could set a policy premium precisely aligned with the individual risk profile (Ewald 2012; Corlosquet-Habart and Janssen 2018; Krüger and Ni Bhroin 2020; Cevolini and Esposito 2020). However, they quickly realised that such a procedure would jeopardise the fundamental principles of the insurance mechanism, which relies on the distribution of risks (i.e., the spread of financial losses) across a pool of policyholders who share the same uncertainty about the future—who share, in other words, the condition that none of them can know in advance who will have an accident or fall ill, when, and how. Under these circumstances, for each individual it is advantageous to pay an insurance premium that in many cases (the most fortunate ones) will prove unnecessary, but allows all members of the pool to be equally protected.⁴

If future harmful events could be known in advance, on the other hand, nobody would be interested in taking out an insurance policy. Those not at risk would regard the premiums as unnecessary expenses, while those more likely to be hit by misfortune would face prohibitively high premiums matching the expected losses. Being an institution based on forecast, of course, insurance has all the interest in enhancing its predictive capacity. Paradoxically, however, it is not in its interest to have perfect predictions, as the latter would mean the end of the insurance business (Wilkie 1997). For this reason, insurance is rather a ‘business of uncertainties’ (Ericson and Doyle 2004, 148).

Empirical research has shown that, for now, behavioural insurance practice is less disruptive than expected (Barry and Charpentier 2020; François and Voldoire 2022; Cevolini and Esposito 2022). The experimentations based on behavioural data have not yet changed the established practices in health and life insurance or in third-party liability car insurance. Both in public and private insurance, moreover, the calculating systems for setting policy premiums do not rely on algorithmic processing of behavioural data but still primarily on actuarial processing of statistical variables. Some level of customisation exists, as

insurance companies, especially private ones, have long used segmentation to make more consistent the assignment of policyholders to groups with similar characteristics (Walters 1981). However, the variables used for segmentation are still primarily non-behavioural.

On the other hand, many observers argue that the availability of behavioural data is changing insurance in different ways (Flückinger and Carbone 2021; Generali Vitality 2023; Guillen and Cevolini 2021). If insurers can detect some behaviour-based variables causally related to future risks (e.g., phone distraction to road accidents, exercise to decreased cardiovascular risks), they can act in advance to avoid the occurrence and mitigate the magnitude of future accidents. Since some measure of risk reduction depends on policyholders changing their behaviour and minimising their exposure to dangers, insurance companies are exploring ways to facilitate this change by feeding specific information extracted from their behavioural data back to individual policyholders.

The goal of insurance, in that case, would be to *predict* and *act* on the present conditions of future damages rather than to *detect* and *restore* them (Anchen and et al. 2020, 19). In other words, insurance would change from a *reactive* to a *proactive* institution in its relationship to individual policyholders (Cevolini and Esposito 2025). Its function would no longer be to compensate for damages after they occurred, but to avoid them in advance. Underpinning this initiative there is the information extracted from individual behavioural data and the financial incentives coupled with this kind of feedback, which are expected to impact policyholders' behaviour.

This innovative proactive approach is crucially different from the engagement of insurance with *prevention*, which is certainly not new to insurance companies and has long involved (indirect and not-targeted) interventions in policyholders' behaviour.⁵ Insurers have always been interested in acting in advance to reduce the two main factors that lead to future losses: The likelihood of accidents and the magnitude of possible damages. Both factors often depend, though not exclusively, on policyholders' behaviour. Insurance companies try therefore to encourage all policyholders to act more prudently. Typical mechanisms in this regard are deductibles and the bonus/malus clause, but also contractual obligations affecting possible future loss compensation.

In the case of deductibles, policyholders know that in the event of an accident they will have to bear losses up to a certain threshold (deductible), while the company will compensate for losses exceeding this threshold. In the case of the bonus/malus clause, policyholders are rewarded with a reduction in their insurance premium or penalised with an increase in their premium upon renewal of their policy, depending on whether or not they filed a claim. In addition to this, insurance companies usually introduce contractual obligations to take precautionary measures (e.g. the installation of a fire alarm and sprinkle system in the building) in order to reduce the likelihood and severity of accidents.

Such preventive mechanisms are strategies for acting indirectly (through financial instruments) on what cannot be directly

observed—namely, the behaviour of policyholders, who are *all subject to the same measures*. This is now changing with digital technologies. Both in motor insurance and health and life insurance, tracking and monitoring devices make it possible for insurance companies to directly observe the behaviour of individual policyholders and intervene *in a targeted manner* to improve it (EIOPA 2019, 20). This possible improvement is driven by feedback mechanisms. The information extracted from behavioural data is returned to individual policyholders either separately (e.g., criticalities in driving attitudes, steps taken daily, sleeping habits, etc.) or in an aggregated form (e.g., a score), accompanied by highly personalised instructions and suggestions on how to improve their behaviour and mitigate the risk of future damages (Interview B.9, 12 April 2024; Interview B.11, 23 April 2024). Financial rewards are provided to those who actively make efforts to improve and prevent—those who behave responsibly.

These practices are fundamentally different from previous contractual clauses (bonuses, deductibles, etc.) implemented by insurance companies, where neither monitoring nor recommendations were personalised. Being focussed on behaviour and hyper-personalised, they can now be *proactive*, that is, meant to directly trigger in a personalised way the active contribution of the single policyholder. Compared to the above mentioned prevention measures, proactive strategies are characterised by a system of innovations consisting of a) the continuous collection of behavioural data through a tracking device, b) the extraction of information related to the individual risk exposure (lifestyle or driving style), c) the feedback sent to the individual policyholder via an app, d) and the overall personalisation of the interaction established between insurance company and policyholders.

This system of innovations implies an unprecedented shift: The function of insurance moves from *financial protection* to (proactive) *enhanced prevention*.⁶ Traditional insurance protection is financial because it relies on the use of money: The insurance agreement does not imply that the damage will not occur, it solely ensures that policyholders who suffer an injury will receive the necessary funds to cope with its consequences. Now, the task of insurance would be to directly avoid the occurrence of damages by acting on each single policyholder. Insurance companies could evolve into a kind of 'advisors' selling personalised preventive services and aiming to act upon present conditions that determine future risks (Picard 2018).

The ongoing experimentations, however, show that the outcomes of proactive insurance practices are still very uncertain. It is unclear whether and how users, assuming they agree to share their behavioural data with the insurer, are willing to engage with the app and follow the 'nudges' they receive from the insurance company (Tanninen 2020; Cevolini and et al. 2025; Interview B.9, 12 April 2024). It is also unclear whether such indications can lead to lasting changes in driving style and lifestyle, and which strategy is most effective in triggering them (Vitality & London School of Economics 2024).

Proactive policies can also have consequences for society as a whole. Besides the mitigation of adverse selection, calculations based on behavioural data are expected to have an impact on the

classic issue of information asymmetry, so that in some cases the insurer would obtain information that is not known to the insured (Cevolini and Esposito 2020). Our research addresses a relevant consequence of this condition. What happens when the insurer aims, in addition to financial protection, to improve individual behaviour and prompt policyholders to take personalised precautionary measures? In proactive insurance, the form of solidarity enacted through the mechanism of risk pooling and spreading would undergo a change. In the next section we focus on this last point, particularly on the relationship between solidarity and responsibility.

3 | Insurance Solidarity and Individual Responsibility

The insurance mechanism is typically described as *transfer of risk* from the insured to the insurer (Banks 2004). This description needs some clarification.

Strictly speaking, the insurer does not take on the risk of the insured. Instead, the insurance company *pools* financial risks (i.e., expected future losses) and *spreads* them across policyholders. In this sense, it is not the insurer who bears the costs of compensation, but the other policyholders belonging to the same pool. This is the social mechanism underlying insurance: *A temporal* issue, that is, the unpredictability of the future, is addressed through a *social* agreement, that is, the mutual dependence of policyholders within the pool. Insuring, therefore, is not merely transferring financial risks, but *distributing* the financial consequences of future contingencies.

The policyholders belonging to the same pool form, in a strictly financial sense, a ‘community of fate’: A damage occurring to one of them involves all the others, because they bear the financial consequences of future uncertainty. This condition is labelled *insurantal solidarity* (Ewald 2020)—which does not imply any feeling of participation, nor any form of mutual-aid interaction, since the members of the pool do not know each other and are not affectively involved in each other's affairs.⁷ Rather, insurantal solidarity indicates a technical-actuarial mechanism to manage future losses within a certain group of individuals (Karten 1977, 186ff.).

This mechanism raises two issues. The first, called actuarial fairness, is the object of a broad and complex debate (Barry 2020). In this contribution, we deal with the second one: The *balance of solidarity and responsibility* among members of the same group of policyholders. Baker (2002, 33) claims that insurance not only distributes risks, it also distributes and socialises responsibility, because whenever decision-makers face a risk they also bear a corresponding responsibility.⁸ How responsibility is addressed depends on the understanding of insurantal solidarity, that can take different forms.

Lehtonen and Liukko (2011, esp. p. 38f.) distinguish three forms of solidarity. In practice, which of these is implemented by insurance companies depends on regulatory constraints—primarily, whether or not insurance companies are allowed to underwrite and segment risk populations based on actuarial

calculations. The first one is *chance solidarity*, whereby each insured individual pays a premium adjusted to their ‘*personal likelihood* of causing damage to the *whole risk pool*’ (p. 38). This is the notion underlying insurance as a pure risk transfer institution, implemented in actuarial practice through risk segmentation. The second form, *subsidising risk solidarity*, is typical of social security and community-rated private insurance: insured individuals pay equal premiums regardless of the risk class to which they are assigned by statistical-probabilistic calculations. This means that individuals belonging to more favourable risk classes subsidise (i.e., pay for) those in less favourable risk classes. In the third form, *subsidising income solidarity*, income differences between social classes are taken into account, and the wealthier policyholders, who are typically also healthier, pay more for social security out of solidarity with the less privileged segments.

Subsidising risk solidarity and subsidising income solidarity somehow socialise responsibility to the whole community, because in different way policyholders support the entire community independently of their individual risk. Chance solidarity, on the contrary, charges directly the other members of the same pool with the consequences of individual exposure to dangers. To some extent, it could be said that while subsidising risk and income solidarity somehow downplay the issue of responsibility, chance solidarity exacerbates it. What happens now with proactive insurance? Which form of responsibility is produced? Can such a form be socialised? How does it affect—if it does—insurance solidarity?

To understand the significance of the question, we must return to the ethical and organisational debate that accompanied the introduction of modern insurance practices. As François Ewald (1986) showed, the introduction of social security in the second half of the 19th century was accompanied by a long and heated discussion focussed on the issue of responsibility, namely, the attribution of blame for damages. Previously, the prevailing approach was a kind of prudentialism based on the idea that ‘individuals should manage [their] risks’⁹ and bear the corresponding responsibility, especially when it could be proved that their behaviour was negligent. In work relationships, which often defined the social identity of individuals, solidarity was based on the *benevolence* of masters as patrons, who took charge of the conditions and wellbeing of their workers.

Each individual was held responsible for his or her own destiny and had to manage his or her own life with appropriate foresight. When individuals did not do so appropriately, the mistakes were attributed to them as individual fault. But since the destitute conditions of the workers often did not allow them to exercise the necessary foresight, the moral law required that the patron sympathised with their difficulties as human beings and intervened with his benevolence. In this form, solidarity and responsibility were individualised: The patron knew each worker personally; the worker remained responsible for his or her own mistakes and shortcomings, and relied on the benevolence of the patron, who could withdraw his support in case of serious faults or lack of gratitude.

The fundamental (and controversial) breakthrough introduced by social insurance through the use of the probabilistic

techniques underlying actuarial calculations was the social generalisation of solidarity, that is, the *separation of solidarity* based on the distribution of losses *from individual responsibility* (Ewald 1986, Ch. 8). The core principle of modern insurance is, in fact, to ensure that those who suffer harm will receive compensation, independently of who is at fault. The issue is not who is responsible, but who needs protection. Insurance intervenes and compensates for the damage even if the person who caused it was reckless or made mistakes, practically separating responsibility from financial accountability.

Over the historical and social development of insurance, the form and measure of this separation have been articulated in complex and different ways, corresponding to the different versions of solidarity presented above. In all of them, however, insurance indirectly gives risky behaviour an unprecedented support. Net of the necessary precautions against abuse and malfunction, insurance broadly protects the activities of individuals against future harm. It thus operates as a ‘liberator of action’ (Ewald 1991, 208) that encourages entrepreneurship, supports initiative, and ultimately makes it possible to take advantage of the openness of the future (Esposito et al. 2024).

Within this established framework of insurance logic, the use of behavioural data now introduces a fundamental change. Behavioural policies seemingly take a step back from the actuarial approach of modern insurance: instead of shifting the focus away from individual responsibility and *distributing risk* in the social dimension, they *transfer responsibility* to the insured, introducing a form of ‘resurgence of prudentialism’ that brings the issue of responsibility back to the forefront.¹⁰

Behavioural policies ask policyholders to engage in loss-prevention activities and reward them accordingly. From behavioural data, the insurance company extracts information about the policyholders’ lifestyle or driving style, and uses this information, as we have seen, to encourage customers to adopt a healthy lifestyle or safe driving style. One of the goals is to *responsibilise* policyholders, counteracting moral hazard through incentives designed to encourage individuals to keep their behaviour under control. For example, those who avoid driving at night, never exceed speed limits, and generally use their car sparingly, or those who get sufficient hours of sleep, undergo regular check-ups, and join a gym, are rewarded with financial incentives such as discounts upon policy renewal, vouchers, and cashback. The incentive could also be a prepaid check-up or a free car inspection, triggering a kind of virtuous circle aimed at prevention.

The responsabilisation enacted by preventive policies can create tensions within the mechanism of insurance solidarity. Those who follow the prompts of insurance, use their car sporadically and drive cautiously have no interest in being in solidarity with those who, although actuarially belonging to the same group of policyholders, drive often and recklessly. Those who comply with the recommendations, paying attention to their diet and exercising every day, are not inclined to be in solidarity with those who eat fast food and lead a sedentary lifestyle. When behavioural policies explicitly aim to responsabilise individuals, these differences in behavioural attitudes among policyholders become evident, and it is not sure that they will be accepted. For

this reason, it has been observed that behavioural policies ‘risk eroding [...] collective responsibility and welfare’, undermining ‘people’s conceptions and expectations of solidarity’ (Krüger and Ni Bhroin 2020, 104; cf. also Eling and Lehmann 2020, 374).

The reason for this erosion is that behavioural data enable the identification, within actuarial pools, of ‘behavioural tribes’ (O’Neil 2016, Ch. 9), that is, groups of people who behave in the same way and therefore share the same probability of suffering an injury (e.g., among 45-year-old males living in Milan, there are those who exercise regularly and those who never do it). Since the insurance premium depends on the risk profile, members of behavioural tribes may expect to pay a ‘fair’ premium based not simply on their belonging to a given actuarial pool¹¹ as a community of fate, but on their belonging to their own behavioural tribe. As Liz McFall (2019, 52ff.) argues, this claim would move towards ‘personalised solidarity’—which is almost an oxymoron, considering that solidarity is inherently collective.

To explore this issue, in the next section we focus on the impact that behavioural policies could have on the idea and practice of responsibility and the main consequences of this impact on insurantal solidarity.

4 | Abstract Mutuality Versus Concrete Self-Interest

The role of responsibility in insurance is very complex. The notion can be examined from various perspectives (e.g., moral, legal, philosophical, sociological). In the case of insurance, responsibility primarily refers to the attribution of damages to individual behaviour and the respective accountability for emerging financial losses. Unlike early-modern insurance associations as mutual-aid corporations and friendly societies, which were small-scale, local and very often based on personal relationship among policyholders (Gosden 1961; Van and Leeuwen 2016; Ismay 2019), the modern insurance system is based on an ‘abstract mutuality’ (Ewald 1991, 203) that transcends networks of personal contacts and is built upon actuarial calculations. In this case, solidarity does not appeal to a sense of moral responsibility towards the co-insured, but can only be understood as a purely financial form of ‘joint liability’.¹² Whereas the local and small-scale nature of friendly societies fostered a form of self-control among the insured (Van and Leeuwen 2016), in modern insurance personal contacts between co-insured members disappear and moral oversight of the behaviour of members belonging to the same pool becomes impossible. As a consequence, *moral hazard* becomes a critical issue.

Moral hazard arises from the fact that transferring financial risk to the insurer reduces the incentive for the insured to take precautions and prevent accidents from occurring (Arrow 1963; Stiglitz 1983; Baker 1996). Those who know that they will not bear the full consequences of their actions are less motivated to avoid dangers (Stiglitz 1983; Heimer 1985). Inherent in moral hazard, therefore, is a paradox: The solution (i.e., insurance coverage) exacerbates the problem (i.e., exposure to risks) that the solution was supposed to solve.

The moral quality of ‘moral’ hazard involves a responsibility towards the policyholders in the same pool who are bound by insurance solidarity (i.e., who share financial liability for future losses). This responsibility depends on the fact that financial losses caused by possibly avoidable damages not only impact the insurance company’s loss ratio, but also affect the future premium that all policyholders will have to pay, and ultimately the resources that the insurance company can allocate. Responsibility then becomes a way of honouring, so to speak, the solidarity that exists among members of the pool, and in this sense solidarity and (collective) responsibility would be connected, as Baker (2002, 47) suggests.

The argument behind behavioural policies is the opposite, and runs as follows: risk depends on individual behaviour, and this behaviour is under individual control. Each person is responsible for the consequences of the risks he or she decides to take, and this responsibility can (and should) be strengthened by increasing awareness of the available options and making policyholders’ voluntary habits manifest. Against the logic of solidarity (which burdens the other members of the pool with the financial consequences of someone’s unsafe behaviour), moral hazard would be countered by being aware of risky behaviour and avoiding it. It does not concern the compensation, it directly concerns the possible damage.

That the individual is ‘master of his/her behaviour and therefore a priori actor of his/her health’ (Laude 2013, 79f.; cf. also Brown 2013, esp. p. 695), however, is disputable, because the distinction between what is under individual control and what is beyond individual control is not easy to draw—and indeed current insurance practice works precisely because it largely disregards it. If, on the other hand, this distinction is to be implemented, the difficulties involved must also be taken into consideration.

Individual responsibility for unhealthy or risky behaviour does not take into account the complexity of socio-economic determinants, understood as those factors that are *not under individual control*.¹³ In the case of life and health insurance, especially, individuals often do not have many alternatives, so they cannot be treated as a proper decision-makers.¹⁴ The crucial question then is: ‘Is lifestyle a choice?’¹⁵ Assuming that there are alternatives whose selection can be interpreted as a decision, who constructs these alternatives? And based on what (socio-economic, cultural and educational) constraints?

In cases where individual control cannot be taken for granted, the effectiveness of prevention based on the use of behavioural data becomes doubtful. One can then wonder whether it is ethically acceptable that people with unhealthy lifestyles should be penalised (Buchanan 2011, 17ff. commenting on Dubois 2011, p. 3ff.; cf. also Pearson and Lieber 2009), and how society as a whole can cope with the consequences of a form of insurance that tends to disadvantage the very individuals who, for reasons partly out of their control, would most need insurance coverage.¹⁶

If the use of behavioural data led to move from ‘abstract mutuality’ to a ‘concrete self-interest’ induced by enhanced awareness of individual risk factors, on the other hand, it would

be even less plausible that policyholders would behave virtuously out of a feeling of responsibility to peers belonging to the same pool. A technology enacting individual responsibility would make it less likely to accept the irresponsibility of others, hence the willingness to feel mutually responsible for the financial damages caused by the imprudent behaviour of other members within the same pool.

5 | Discussion and Conclusions

The availability of behavioural data and its use by insurance companies to assess individual risk profiles may increase the inevitable tension between the principles of insurance solidarity and individual responsibility. Whereas traditional actuarial practices depower responsabilisation, personalised behavioural policies—especially when they include a proactive approach—could increase policyholders’ awareness of their individual contribution to losses, that is, make them feel responsible. But since this responsibility concerns only their own losses and not those of other policyholders, this tendency could jeopardise the specific form of solidarity that insurance generates among those in the same pool. Shared uncertainty would be burdened by the reference to individual blame.

So far, however, in behavioural policies the premium is still calculated in a rather traditional manner—i.e., based on actuarial science—and behavioural data are processed separately to calculate a score which is the sole criterium for financial rewards (Cevolini and Esposito 2022; Interview B.2, 21 September 2023; Interview B.11, 23 April 2024).¹⁷ Both in motor insurance and in life & health insurance policies, behavioural data are used to implement a mechanism reminiscent of the bonus/malus system, yet without malus. If the insured behave well, they are rewarded. If they do not behave well, they are not rewarded, but neither are they penalised (e.g., with an increase in the policy premium at renewal). As a software provider engaged in proactive health & life insurance told us, insurance companies prefer to be ‘all carrot and no stick’ (Interview B.6, 1 March 2024). But it is reasonable to assume that a true policyholder responsabilisation could only be enacted if behavioural data were used to calculate the insurance premium, that is, if policyholders who do not behave appropriately had to pay more. That this does not happen (yet) may have several explanations.

For one thing, insurance companies are very reluctant to challenge long-established actuarial practices that work very well by introducing calculation practices whose social outcomes are unpredictable (Interview B.2, 21 September 2023). Another reason relates to the relationship between insured and insurer. As long as the insurer merely offers the insured advice and suggestions on how to improve their behaviour to reduce their exposure to dangers, and rewards them accordingly (bonus), the insured can accept the insurer’s intrusion into their private life, with all the consequences this entails for information asymmetry. But if the insurer were to impose penalties (malus) on the insured for failing to meet their goals or behaving in a manner deemed imprudent, then the dynamics of the insurance relationship would change significantly.

Intrusion could be perceived as a form of surveillance and punishment¹⁸ that could transform the insurance institution in a disruptive way.

A third reason to be cautious about the use of behavioural data, but one that insurers think less about, concerns the function of insurance protection for the insured. A behavioural calculation of the policy premium would affect the social management of future uncertainty and the ability to use the latter productively. Behavioural policies, as we have seen, aim to improve the behaviour of policyholders in order to act on possible accidents before they happen. On the other hand, it has been observed that ‘insurers have limited skills in changing behaviours’ (Spender et al. 2019, 25)—and indeed changing the behaviour of policyholders *has never been* the function of insurance, which instead has, as we have seen, the function of making the uncertainty of the future manageable.¹⁹

Adding proactivity to this task, however seemingly attractive, is not necessarily consistent with the established actuarial forms of uncertainty exploitation and risk distribution. The threat is that proactivity turns into a form of *deterrence*. Instead of acting as a ‘liberator of action’ (Ewald 1991, 208), behavioural policies that aim to increase the awareness of possible losses and the personal responsibility of policyholders could turn into a sort of ‘inhibitor of action’, encouraging people to act as little as possible (Cevolini and Esposito 2020, 7).

This already happens to some extent: The PHYD (pay-how-you-drive) Snapshot insurance policy sold by Progressive suggests to the policyholders to ‘drive less overall’ in order to reduce the costs of insurance—and many other PHYD policies follow a similar approach. Prevention thus risks contracting the active construction of the future, without necessarily limiting risks (indeed, creating new ones). The future, after all, always comes about as it comes about, without necessarily following the plans and the wishes of the actors, but the initiatives of the actors increase the available possibilities, and thereby also the options offered to society as a whole.

Mikael Dubois (2011, p. 6) expresses, in this respect, a widespread opinion when he argues that prevention policies are in need of ‘justification by arguments drawn from moral and political philosophy’, and that only by providing such a justification can prevention policies gain ‘widespread acceptance among the general public’. This is correct, of course. But risk prevention is also risky, and social theory should contribute to explaining the complexity of the situation that arises when insurance takes on a function—proactivity—which traditionally does not belong to it.

Acknowledgements

This work was supported by the European Research Council (ERC) under Advanced Research Project PREDICT, no. 833749.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Endnotes

- ¹ In a seminal report prepared for the Institut Montparnasse, Ewald (2012, 72) argued that the introduction of digital technologies could initiate a ‘new era of insurance’.
- ² In the insurance industry, people speak of IoT, both in the sense of Internet of Things and in the sense of Insurance of Things. IoT implies the use of digital devices, machine learning techniques, predictive algorithms, artificial intelligence (AI), and more.
- ³ See the contributions published in the special issue on ‘The Personalisation of Insurance’ edited by McFall et al. (2020).
- ⁴ In this respect, the lack of knowledge has a crucial social value and represents a fundamental pre-condition of solidarity. Cf. Rothschild and Stiglitz (1976, esp. p. 639). Cf. also Ewald (2012, 8) in the wake of Rawls’ ‘veil of ignorance’.
- ⁵ In the 1990s, for example, Canadian insurance companies proposed the necessity of transforming the insurance industry (particularly the third-party liability motor insurance sector) into a loss-prevention industry, whose primary goal should be to ‘stop claims before they happen’ (Ericson et al. 2003, 271ff.). The main assumption was that accidents (i.e., crashes) do not simply occur. Rather, ‘drivers make crashes happen’ and they must therefore be made ‘responsible for preventing them through education about risks to be avoided and taken’ (p. 272). From this perspective, prevention and responsibility were considered two sides of the same coin.
- ⁶ See the recent report by Generali Vitality (2023, p. 15). Cf. also Cultu and et al. (2019, 5), according to whom ‘the power of prevention’ implies ‘reimagining the insurer’s role’.
- ⁷ As we shall see in Section 4, this is one of the main differences between early-modern insurance associations and modern insurance system.
- ⁸ According to Baker (2002, 35) insurance could be understood as a form of *social* responsibility. In this case, solidarity among members of the same pool would be based on feeling some degree of responsibility for each other (p. 47).
- ⁹ O’Malley (1996, p. 196). O’Malley showed how this prudentialism came back again in the 1990s. The idea was that individuals ‘should be prudent instead of relying on socialised securities’ (p. 197).
- ¹⁰ Underlying prudentialism is the idea that the collectivist risk management should be at least partially removed in order to ‘throw back upon the individual the responsibility for managing risk’ (O’Malley 1996, 197). Only in this way could one curb that negligence of prevention that insurance coverage unintentionally fosters. In the early 2000s, this return of responsibility within the insurance mechanism also found legislative coverage. For France, see Laude (2013); for Germany, see Schmidt (2008). The call for responsibility can already be found in non-behavioural policies, such as those covering catastrophic risks. Cf. Barry (2023) on the 1982 CatNat, a measure that finally opts for solidarity rather than individual responsibility.
- ¹¹ According to the traditional understanding of actuarial fairness.
- ¹² As Charles Hardwick already argued in the mid-nineteenth century (Hardwick 1869, 60 and p. 79ff.).
- ¹³ The literature is extensive. See Dworkin (1981, 29): ‘The claim that individuals are personally responsible for their health is ambiguous’; Wikler (1987, (2002), 53): ‘[Insurance] policies giving personal responsibility for health a central role face severe objections’; Nullmeier (2005); Feiring (2008); Buchanan (2011); Brown (2013); Maio (2014); Steiner (2018).

- ¹⁴ On the relationship between decision, construction of alternatives, and ascription of responsibility, see Corsi (2023). Dworkin (1981, 29ff.), dealing with causal-responsibility, makes the example of an individual with low education who chooses a decent paying but very dangerous job. The lack of high-education means that the individual has no alternative, at least if he or she wants to have a decent wage. The only real alternative would be to avoid danger but live miserably.
- ¹⁵ Cf. also Lehtonen and Liukko (2015, 164): 'It is not always clear to what extent a person can be held responsible for his or her lifestyle'. Maio (2014, p. 392) points out that underprivileged social classes have less 'free space' of choice for their lifestyle and should not, consequently, be blamed for unhealthy habits. In a sense, these classes are 'trapped' in a lifestyle determined by their socio-economic and cultural milieu. Therefore, society should not sacrifice an evolutionary achievement, namely solidarity.
- ¹⁶ This, by the way, was exactly the reasoning behind the introduction of insurantal solidarity in the late 19th century, investigated by Ewald (1986): workers were often in such destitute conditions that social protection for injury could not properly rely on their responsible decision.
- ¹⁷ National and international legislations place many constraints. In Germany, the BaFin (Bundesanstalt für Finanzdienstleistungsaufsicht) has strongly advised against (in fact, prohibited) insurance companies from using behavioural data to rate life and health policies. This was reported to us by a head of a major insurance company selling in Germany and France health & life insurance policies based on behavioural data (Interview B.2, September 21, 2023). For France, see Jeanningros (2021).
- ¹⁸ In the sense of Foucault (1975). Cf. also Zuboff (2018).
- ¹⁹ Looking at the historical origins of insurance, from bottomry to the earliest late-medieval and early-modern maritime insurance contracts, one might argue that changing the behaviour of policyholders has always been a function of insurance. In these insurance agreements, the conditions of coverage were often specified in great detail—for example, the route the ship should follow, the season of the year in which the voyage would take place, and even the name of the captain and the type of vessel used (Ceccarelli 2007 distinguishes, in this regard, between contingent variables and structural variables). However, as extensive historical research has demonstrated (Edler de Roover 1945; Heers 1959; Melis 1975; Nehlsen-von Stryk 1986; Tenenti and Tenenti 1985), all these elements were included in the insurance contract to better assess risk exposure and adjust the insurance premium accordingly. The true function of these contractual terms was, therefore, *risk classification* rather than *behaviour change*.

References

- Anchen, J., et al. 2020. "Machine Intelligence in Insurance: Insights for End-To-End Enterprise Transformation." *Sigma: Linguistique Anglaise, Linguistique Generale* 5: 1–30.
- Arrow, K. 1963. "Uncertainty and the Welfare Economics of Medical Care." *American Economic Review* 53, no. 5: 941–973.
- Baker, T. 1996. "On the Genealogy of Moral Hazard." *Texas Law Review* 75, no. 2: 237–292.
- Baker, T. 2002. "Risk, Insurance, and the Social Construction of Responsibility." In *Embracing Risk. The Changing Culture of Insurance and Responsibility*, edited by T. Baker and J. Simon, 33–51. University of Chicago Press.
- Banks, E. 2004. *Alternative Risk Transfer. Integrated Risk Management through Insurance, Reinsurance and the Capital Market*. Wiley & Sons.
- Barry, L. 2020. "Insurance, Big Data, and Changing Conception of Fairness." *European Journal of Sociology* 61, no. 2: 159–184. <https://doi.org/10.1017/s0003975620000089>.
- Barry, L. 2023. "The Moral Economies of Natural Disasters Insurance: Solidarity or Individual Responsibility?" *Journal of Cultural Economy* 17: 1–17: first online 6 October. <https://doi.org/10.1080/17530350.2023.2258909>.
- Barry, L., and A. Charpentier. 2020. "Personalization as a Promise: Can Big Data Change the Practice of Insurance?" *Big Data & Society* 7, no. 1: 1–12. <https://doi.org/10.1177/2053951720935143>.
- Brown, R. 2013. "Moral Responsibility for (Un)healthy Behaviour." *Journal of Medical Ethics* 39, no. 11: 695–698. <https://doi.org/10.1136/medethics-2012-100774>.
- Buchanan, D. 2011. "Should People With Unhealthy Lifestyles Pay Higher Premiums?" *Journal of Primary Prevention* 32, no. 1: 17–21. <https://doi.org/10.1007/s10935-011-0235-y>.
- Ceccarelli, G. 2007. "The Price for Risk-Taking: Marine Insurance and Probability Calculus in the Late Middle Ages." *Journal Electronique d'Histoire des Probabilités et de la Statistique* 3, no. 1: 1–26.
- Cevolini, A., and E. Esposito. 2020. "From Pool to Profile: Social Consequences of Algorithmic Prediction in Insurance." *Big Data & Society* 7, no. 2: 1–11. <https://doi.org/10.1177/2053951720939228>.
- Cevolini, A., and E. Esposito. 2022. "From Actuarial to Behavioural Valuation: The Impact of Telematics on Motor Insurance." *Valuation Studies* 9, no. 1: 109–139. <https://doi.org/10.3384/vs.2001-5992.2022.9.1.109-139>.
- Cevolini and Esposito, 2025 Cevolini, A. & Esposito, E. (2025). From Reactivity to Proactivity: The Use of Behavioural Data in Health and Life Insurance. Preprint. <https://doi.org/10.2139/ssrn.5239500>. (under submission)
- Cevolini, A. et al. (2025). Can Telematics Improve Driving Style? The Use of Behavioural Data in Motor Insurance. Preprint. <https://arxiv.org/abs/2309.02814> (under submission).
- Corlosquet-Habart, M., and J. Janssen, eds. 2018. *Big Data for Insurance Companies*. Wiley & Sons.
- Corsi, G. 2023. "L'autoresponsabilità nella società del rischio. Un'analisi sociologica." In *Il principio di autoresponsabilità nella società e nel diritto*, edited by G. Fornasari, et al. 41–56. Editrice Scientifica.
- Cultu, D., et al. 2019. *Claims 2030: Dream or Reality?* McKinsey & Company.
- Daston, L. 1983. "Rational Individuals versus Laws of Society: From Probability to Statistics." In *Probability since 1800. Interdisciplinary Studies of Scientific Development*, edited by M. Heidelberger, et al., 7–26. B. K. Verlag.
- Daston, L. 1987. "The Domestication of Risk: Mathematical Probability and Insurance 1650-1830." In *The Probabilistic Revolution*, edited by L. Krüger, et al., 237–260. MIT Press.
- Denuit, M., M. Guillen, and J. Trufin. 2019. "Multivariate Credibility Modelling for Usage-Based Motor Insurance Pricing With Behavioural Data." *Annals of Actuarial Science* 13, no. 2: 378–399. <https://doi.org/10.1017/s1748499518000349>.
- Desrosières, A. 2010. *La politique des grands nombres. Histoire de la raison statistique*. Éditions La Découverte.
- Dubois, M. 2011. "Insurance and Prevention: Ethical Aspects." *Journal of Primary Prevention* 32, no. 1: 3–15. <https://doi.org/10.1007/s10935-011-0234-z>.
- Dworkin, R. 1981. "Taking Risks, Assessing Responsibility." *Hastings Center Report* 11, no. 5: 26–31. <https://doi.org/10.2307/3561296>.
- Edler de Roover, F. 1945. "Early Examples of Marine Insurance." *Journal of Economic History* 5, no. 2: 172–200. <https://doi.org/10.1017/s0022050700112975>.
- EIOPA. 2019. "Big Data Analytics in Motor and Health Insurance: A Thematic Review." *EIOPA*.

- Eling, M., and M. Lehmann. 2020. "The Impact of Digitalization in the Insurance Value Chain and the Insurability of Risks." *Geneva Papers on Risk and Insurance* 43, no. 3: 359–396. <https://doi.org/10.1057/s41288-017-0073-0>.
- Ericson, R., and A. Doyle. 2004. *Uncertain Business. Risk, Insurance, and the Limits of Knowledge*. University of Toronto Press.
- Ericson, R., A. Doyle, and D. Barry. 2003. *Insurance as Governance*. University of Toronto Press.
- Esposito, E., D. Hofmann, and C. Coloni. 2024. "Can a Predicted Future Still Be an Open Future? Algorithmic Forecasts and Actionability in Precision Medicine." *History and Theory* 63, no. 1: 4–24. <https://doi.org/10.1111/hith.12327>.
- Ewald, F. 1986. *L'État Providence*. Grasset.
- Ewald, F. 1991. "Insurance and Risk." In *The Foucault Effect. Studies in Governmentality*, edited by G. Burchell, et al., 197–210. Harvester Wheatsheaf.
- Ewald, F. 2012. *Assurance, prévention, prédiction... dans l'univers du Big Data*. Institut Montparnasse.
- Ewald, F. 2020. *The Birth of Solidarity: The History of the French Welfare State*. Duke University Press.
- Feiring, E. 2008. "Lifestyle, Responsibility and Justice." *Journal of Medical Ethics* 34, no. 1: 33–36. <https://doi.org/10.1136/jme.2006.019067>.
- Flückinger, I., and M. Carbone. 2021. *From Risk Transfer to Risk Prevention. How the Internet of Things Is Reshaping Business Models in Insurance*. Geneva Association.
- Foucault, M. 1975. *Surveiller et punir. Naissance de la prison*. Gallimard.
- François, P., and T. Voldoire. 2022. "The Revolution That Did Not Happen: Telematics and Car Insurance in the 2010s." *Big Data & Society* 9, no. 2: 1–12. <https://doi.org/10.1177/20539517221142033>.
- Generali Vitality 2023. *Protection to Prevention: Generali Vitality and Smart Insurance Tech*. Digital Report 2023 in. Association with Garmin.
- Gosden, P. H. J. H. 1961. *The Friendly Societies in England 1815-1875*. Manchester University Press.
- Guillen, M., and A. Cevolini. 2021. "Using Risk Analytics to Prevent Accidents Before They Occur—The Future of Insurance." *Journal of Financial Transformation* 54: 76–83.
- Hacking, I. 1975. *The Emergence of Probability: A Philosophical Study of Early Ideas about Probability, Induction, and Statistical Inference*. Cambridge University Press.
- Hacking, I. 1990. *The Taming of Chance*. Cambridge University Press.
- Hardwick, C. 1869. *The History, Present Position and Social Importance of Friendly Societies*. John Heywood/Simpkin, Marshall & Co.
- Heers, J. 1959. "Le prix de l'assurance à la fin du Moyen Âge." *Revue d'Histoire Economique et Sociale* 37, no. 1: 7–19.
- Heimer, C. 1985. *Reactive Risk and Rational Action. Managing Moral Hazard in Insurance Contracts*. University of California Press.
- Ismay, P. 2019. *Trust Among Strangers. Friendly Societies in Modern Britain*. Cambridge University Press.
- Jeanningros, H. 2021. "Capter, quantifier, gouverner. L'assurance comportementale au service de la prévention?" *Revue Française de Socio-Économie* 26, no. 1: 47–66.
- Karten, W. 1977. "Solidaritätsprinzip und versicherungstechnischer Risikoausgleich—Einige ökonomische Grundtatbestände." *Zeitschrift für die Gesamte Versicherungswissenschaft* 66: 185–203.
- Krüger, S., and N. Ni Bhroin. 2020. "Vital Signs: Innovations in Self-Tracking Health Insurance and Social Change." *Journal of Media Innovations* 6, no. 1: 93–108. <https://doi.org/10.5617/jomi.7836>.
- Laude, A. 2013. "Le patient entre responsabilité et responsabilisation." *Les Tribunes de la Santé* 41, no. 4: 79–87.
- Lehtonen, T.-K., and J. Liukko. 2011. "The Forms and Limits of Insurance Solidarity." *Journal of Business Ethics* 103, no. 1: 33–44. <https://doi.org/10.1007/s10551-012-1221-x>.
- Lehtonen, T.-K., and J. Liukko. 2015. "Producing Solidarity, Inequality and Exclusion through Insurance." *Res Publica* 21, no. 2: 155–169. <https://doi.org/10.1007/s11158-015-9270-5>.
- Maio, G. 2014. "Gesundheit als Pflicht—Krankheit als Schuld? Warum Eigenverantwortung und Solidarität zusammengehören." *Der Klinikarzt* 43, no. 9: 392–393. <https://doi.org/10.1055/s-0034-1394467>.
- McFall, L. 2019. "Personalizing Solidarity? the Role of Self-Tracking in Health Insurance Pricing." *Economy and Society* 48, no. 1: 52–76. <https://doi.org/10.1080/03085147.2019.1570707>.
- McFall, L., G. Meyers, and I. V. Hoyweghen. 2020. "Editorial: The Personalisation of Insurance: Data, Behaviour and Innovation." *Big Data & Society* 7, no. 2: 1–11. <https://doi.org/10.1177/2053951720973707>.
- Melis, F. 1975. *Origini e sviluppi delle assicurazioni in Italia (secoli XIV-XVI)*. Istituto Nazionale delle Assicurazioni.
- Nehlsen-von Stryk, K. 1986. *Die Venezianische Seeverversicherung im 15. Jahrhundert*. Ebelsbach am Main: Rolf Gremer.
- Nullmeier, F. 2005. "Paradoxien der Eigenverantwortung." *Zentrum für Sozialpolitik (ZES)* 10, no. 1: 1–4.
- O'Malley, P. 1996. "Risk and Responsibility: Liberalism, Neo-Liberalism and Rationalities of Government." In *Foucault and Political Reason*, edited by A. Barry, et al., 189–208. Routledge.
- O'Neil, C. 2016. *Weapons of Math Destruction. How Big Data Increases and Threatens Democracy*. Broadway Books.
- Pearson, S., and S. Lieber. 2009. "Financial Penalties for the Unhealthy? Ethical Guidelines for Holding Employees Responsible for Their Health." *Health Affairs* 28, no. 2: 845–852. <https://doi.org/10.1377/hlthaff.28.3.845>.
- Picard, F. 2018. "Current Vision and Market Prospective." In *Big Data for Insurance Companies*, edited by M. Corlosquet-Habart and J. Jansen, 83–129. Wiley & Sons.
- Porter, T. 1986. *The Rise of Statistical Thinking 1820-1900*. Princeton University Press.
- Rothschild, M., and J. Stiglitz. 1976. "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information." *Quarterly Journal of Economics* 90, no. 4: 629–649. <https://doi.org/10.2307/1885326>.
- Schmidt, H. 2008. "Bonuses as Incentives and Rewards for Health Responsibility: A Good Thing?" *Journal of Medicine and Philosophy* 33, no. 3: 198–220. <https://doi.org/10.1093/jmp/jhn007>.
- Spender, A., C. Bullen, L. Altmann-Richer, et al. 2019. "Wearables and the Internet of Things: Considerations for the Life and Health Insurance Industry." *British Actuarial Journal* 24, no. e22: 1–31. <https://doi.org/10.1017/s1357321719000072>.
- Steiner, R. 2018. "Big Data, mutualisation et exclusion en assurance." *Enjeux numériques* 2: 71–77.
- Stiglitz, J. 1983. "Risk, Incentives and Insurance: The Pure Theory of Moral Hazard." *Geneva Papers on Risk and Insurance* 8, no. 26: 4–33. <https://doi.org/10.1057/gpp.1983.2>.
- Swedloff, R. 2014. "Risk Classification's Big Data (R)evolution." *Connecticut Insurance Law Journal* 21, no. 1: 339–373.
- Tanninen, M. 2020. "Contested Technology: Social Scientific Perspectives of Behaviour-Based Insurance." *Big Data & Society* 7, no. 2: 1–14. <https://doi.org/10.1177/2053951720942536>.

- Tenenti, A., and B. Tenenti. 1985. *Il prezzo del rischio. L'assicurazione mediterranea vista da Ragusa, 1563–1591*. Jouvence.
- Van Leeuwen, M. H. D. 2016. *Mutual Insurance 1550-2015: From Guild Welfare and Friendly Societies to Contemporary Micro-insurers*. Palgrave Macmillan.
- Vitality & London School of Economics 2024. *The Vitality Habit Index: Quantifying Habits and Their Impact on Health*. White Paper.
- Walters, M. A. 1981. "Risk Classification Standards." *Proceedings of the Casualty Actuarial Society* 68, no. 129: 1–23.
- Wikler, D. 1987. "Who Should Be Blamed for Being Sick?" *Health Education Quarterly* 14, no. 1: 11–25. <https://doi.org/10.1177/109019818701400104>.
- Wikler, D. 2002. "Personal and Social Responsibility for Health." *Ethics and International Affairs* 16, no. 2: 47–55. <https://doi.org/10.1111/j.1747-7093.2002.tb00396.x>.
- Wilkie, D. 1997. "Mutuality and Solidarity: Assessing Risks and Sharing Losses." *Philosophical Transactions of the Royal Society B: Biological Sciences* 352, no. 1357: 1039–1044. <https://doi.org/10.1098/rstb.1997.0082>.
- Zuboff, S. 2018. *The Age of Surveillance Capitalism. The Fight for a Human Future and the New Frontier of Power*. Public Affairs.