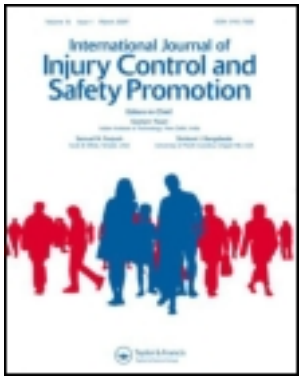

International Journal of Injury Control and Safety Promotion

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/nics20

The role of accident theory in injury prevention - time for the pendulum to swing back

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Version of record first published: 06 Feb 2012.

To cite this article: Ragnar Andersson (2012): The role of accident theory in injury prevention - time for the pendulum to swing back, International Journal of Injury Control and Safety Promotion, 19:3, 209-212

To link to this article: http://dx.doi.org/10.1080/17457300.2012.658577

International Journal of Injury Control and Safety Promotion
Vol. 19, No. 3, September 2012, 209–212

Taylor & Francis
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The role of accident theory in injury prevention – time for the pendulum to swing back

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(*Received 5 December 2011; final version received 15 January 2012*)

Injury prevention is a branch of safety sciences. While comprehensive theoretical developments occurred in the wider field in the last decades, little of these developments reached and influenced the injury prevention community. Instead, a clear retro trend 'back to basics' is seen among injury prevention scholars, especially to Dr William Haddon's pioneering work some 50 years ago. This paper intends to draw attention to this polarisation and discuss possible explanations. It is argued that the strong campaign against the accident concept among leading injury prevention groupings became a serious hindrance for theoretical exchange. The underlying process is interpreted in terms of a struggle for ownership over this truly interdisciplinary field of research, unfortunately at the expense of theoretical stagnation in injury prevention circles and lessened interest in collaboration from other scientific areas. This paper is written as a tribute to Professor Leif Svanström and his scientific contributions, with special regard to his genuine interest in interdisciplinary research.

Keywords: accident theory; models; injury prevention

Introduction

Modern safety sciences encompass broad fields of loss control where injury prevention is just one branch among others. This article is dedicated to Professor Leif Svanström and his scientific deed from my personal perspective based on our long-standing collaboration. It all started in the early 1970s when 'accident research' was still the all-embracing concept, not least through the epoch-making textbook with the same title by Haddon, Suchman, and Klein (1964). Notions of the word accident were not yet a controversial issue. Like other researchers in the field, our ambition was to disclose underlying environmental, human, organisational and societal causes of accidents in order to support preventative actions. Actually, we did comment on the unfortunate connotations of the term accident already in some of our early writings, long before the onset of the intensive campaign against this term. But we could also conclude from our own empirical findings that spontaneous fatalistic sayings on causation do not seem to obstruct or aggravate rational attitudes to prevention, neither among ordinary people nor among experts (Andersson, Johansson, Lindén, Svanström, & Svanström, 1979; Andersson & Svanström, 1980). So we remained accident researchers.

We were also, like many colleagues, especially in Scandinavia and some other parts of Europe, very much inspired by contemporary theoretical contributions to accident research rooted in systems and control theory, in addition to the epidemiological and biomechanical inheritance from Haddon and others. One important contribution was the Canadian engineering scientist Jean Surry's bi-sequential model on occupational accident causation based on a clear systems-oriented view of human–environment interaction (Surry, 1969). Her model's first sequence illustrates the conditions for maintaining the control of hazards embedded in the environment, while the second illustrates the possibilities to control human or material loss from an accidental series of events, once it has been triggered; that is, once the hazard control described in the first sequence has failed. Surry's model represented new and important ways to understand and explain accident and injury causation beyond just statistical associations.

In the wake of Surry, numerous other similar systems-based models emerged in the literature. Benner (1975) contributed from the high-tech side, also pointing at basically the same two sequences or phases of concern: how to control regular operation in order to maintain stability or homeostasis, and secondly, how to minimise loss when the system gets out of control, for example, when a nuclear reactor is perturbed out of its built-in recovery limits. Wilde

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ISSN 1745-7300 print/ISSN 1745-7319 online

http://dx.doi.org/10.1080/17457300.2012.658577
http://www.tandfonline.com

(1982), a Canadian psychologist engaged in road safety, developed his famous risk homeostasis model on behavioural control centred on individual risk acceptance. Kjellén and Larsson (1981), like many others, incorporated organisational management theory in order to encompass managerial control of hazardous operations, and Rasmussen (1997) added levels of political and societal governance on top of organisational levels in order to model risk management in complete hierarchical socio-technical systems. Just to mention a few.

Today, a broad field of science has grown out of these roots, basically centred on the issue of how to control hazards inherent in systems in order to avoid losses. Famous scholars include Andrew Hale, James Reason, Erik Hollnagel, Charles Perrow and many others.[1] The systems approach, as applied in engineering, psychology, sociology, etc., is now dominant in most fields of safety research, except in injury prevention as developed within public health. Why is it that so little of these advancements are known and recognised among public health injury prevention researchers, and what are the implications?

Two levels of theory

As emerges from above, safety sciences encompass two major study questions:

- What makes systems run out of control, and how can we better control them?
- How can we better prevent damage from systems when the control is lost?

The first study question is general and independent of the nature of losses to be prevented, to a large extent, while the second one is specific to each type of loss, depending on the vulnerable properties of the object to be protected. If human life and health is the principal concern, human vulnerability is certainly a key issue.

It is true that most comprehensive accident and injury prevention frameworks target both these questions ever since Haddon (the pre-event vs. event and post-event phases), and Heinrich before him (Haddon, 1980; Heinrich, 1931). However, the host–agent–environment interactions in the pre-event phase were never explored in depth by Haddon, or by any of his successors in public health. Instead, these developments occurred primarily in circles outside public health, such as in engineering, psychology, sociology and ergonomics. From different backgrounds, scientists engaged in a truly interdisciplinary endeavour to model these interactions, whether applied to motor vehicle driving, walking, bicycling, working or any other activity. Systems theory is a universal tool employed in many disciplines to understand interactive dynamics and the conditions for stability and control. Mutuality, interaction and complexity are considered keys to understanding causation, and the term accident is widely used without controversy with reference to events when control is lost and damage occurs as a consequence.

In contrast, injury prevention, as developed within public health, took its position from a medico-definitional perspective of injury vs. disease, rejected the term accident on the same medical grounds and defined injury prevention (later renamed to injury control in order to better include severity modification) as an art devoted to minimise harmful sudden impacts from energy or substance exchange to human beings. Causation is here conceptualised as linear impacts and dose–response associations.

Merging or diverging developments?

In the best of all possible worlds, we would have seen these two strands of research joining hands a long time ago. The two approaches are both relevant, they are clearly complementary, and they both deserve scientific attention on their own merits. Dr Svanström saw the potentials of integrating systems theory in epidemiology and public health, and encouraged me to go ahead on this path. However, when planning the first World Conference on Accident and Injury Prevention in Stockholm, Sweden, 1989, we became brutally aware of the strong neo-Haddonist movement especially in the US, but also in countries like Australia, New Zealand and Canada, and its aversion to the accident concept. International colleagues told us that 'injuries are no accident', and urged us to discontinue the use of the term accident. The conference, originally intended to be announced as the First World Conference on Accident Prevention, was diplomatically renamed to the First World Conference on Accident and Injury Prevention, a reasonable and inclusive compromise one might think, but was changed again to just 'injury control', solely, already when the second conference, organised in 1993, was held in Atlanta, USA.

Most readers of this journal know the rest of the story. In 2001, the BMJ Publishing Group decided to ban the word accident (Davis & Pless, 2001), thereby banning a whole scientific community engaged in safety research and unfortunately also representing the bulk of theoretical advancements in the field since Haddon. The divorce became irrevocable, and since then the two strands of research have largely walked separate paths. The devastating harm from this action to safety sciences is hard to exaggerate.

Interpreting the underlying drivers of this process is a difficult task, but personally I consider these

developments as a struggle for scientific ownership between medical and non-medical circles. Such struggles are not necessarily negative; competition is important also in science. But if openness, humbleness, criticism and self-reflection are allowed to be replaced by conviction, belief and rhetoric, we have certainly left the domain of science and entered the world of policy, ideology and religion. From one angle, injury is the problem, but from another, accidents are, and we should be open to both angles. Injury is broader in the sense that it includes also intentional violence to the body, but accidents are broader in the sense that it incorporates a wider spectrum of harm, also to human health. Like violence, accidents may result in psychological harm besides physical. Accidents may also result in diseases initiated by sudden exposures to chemicals, radiation, overload, biological agents, etc. Controlling accidents is thus an approach just as relevant and important as controlling injuries.

The ownership of injury control clearly rests with the medical community, more precisely the somatic side of medicine since the term unfortunately excludes psychological dimensions of sudden harm. Correspondingly, controlling accidents and violence, in the sense of controlling potential sudden harm from human, technical, socio-technical and/or social systems, largely belongs to the community outside the health sector. Claiming the need for intersectoral and interdisciplinary collaboration, as we all do, while at the same time denying other sectors and disciplines their right to define the problem from their views, just represents discipline-centric attempts to establish and maintain hegemony.

Suicidology – a vital and inspiring example

Some branches of health related safety research have evolved better theoretically, partly because of their relative independence from the public health injury prevention community. Examples include the study of balance and falls, as developed in ergonomics, neurology and physiotherapy; violence prevention, as developed in criminology, psychology and sociology; occupational safety, as developed in engineering and management under the International Labour Organization umbrella; transport safety, as developed in engineering, psychology and biomechanics; patient safety, by learning from potentially hazardous but operationally very safe industries such as aviation; and not least suicide prevention, as developed in suicidology. In all these fields, the twofold concern of controlling regular operation on one hand, and minimising adverse outcomes when regular systems control has failed, on the other hand, is apparent.

Suicide is an excellent example, also because scholars in this field managed to establish their own comprehensive and multifaceted discipline: suicidology. The main concern in suicidology is not why people get injured from gunshots, hanging or substance overdoses, but why people decide to commit these self-harming acts. The ruling theoretical framework is the so-called suicidal process model, illustrating how normal thoughts on life and death, including suicidal thoughts to some extent, are controlled by individuals in everyday life, and how and why this normal and essentially healthy struggle with daily life and thoughts can be disturbed beyond the limits of the individual's capacity to maintain and regain control of his or her own life, leading to suicide appearing a reasonable exit (Beskow, 2010). The parallels here to accident theory are obvious. There is a state of normal healthy life characterised by latent risk factors being kept under control. Also, there are elements of individual and situational conditions potentially capable of triggering an uncontrolled and escalating series of events leading to attempted or fulfilled suicide. The key issues are (1) how to maintain, protect and promote the healthy self-regulating state and (2) how to intervene in the acute situation when the individual is out of self-control. Suicidologists now increasingly talk about suicides as psychological accidents, thereby underlining these similarities (Beskow, 2010). This has also led to a growing interest in accident models and general systems theory in modern suicidology.

Concluding remarks

It is noteworthy that the World Health Organization (WHO) some years ago decided to widen their narrow injury perspective to 'violence and injury' (WHO, 2002). Obviously, there was an insight that the injury concept was not enough to capture the psychosocial dimensions of interpersonal or self-directed violence. The solution was to go beyond the corporal manifestations of physical harm, the injuries, by adding a broad term for the external causes at issue – violence. Fine! This opens up for studies on violence and its impact on human health and well-being from the broader perspective of the causal phenomenon, not a specific spectrum of effects, which is much more fruitful for a comprehensive understanding of health burdens from violence. But for accidents, all those seemingly non- (or less-) intentional events occurring in hazardous systems we have in fact developed intentionally and often with full awareness of their inherent hazards and weaknesses, we are still stuck within the narrow frame of injury prevention. We are still being told to define these events as injury events, regardless of whether somatic injury is really the main concern, and their corporal impacts as unintentional injuries regardless of the complexity of human intentionality, and regardless

of the obvious fact that intentionality can only be attributed to acts and thoughts, not to their results. Like violence, accidents also sometimes leave victims suffering more from psychological distress than physical, and both accidents and acts of violence can involve damage to other values than human health. There is no fundamental difference between violence and accidents in these respects. So, the next logical step would be to rename this policy area to 'violence, accident and injury prevention' to give a balanced recognition to relevant perspectives, or to simply redefine the term violence to include all sudden exposures regardless of intention.

Dr Svanström deserves great honour and respect for many things. What I personally appreciate most is his genuine and unconditioned interest in interdisciplinary research. He once generously invited me with my engineering background to his interdisciplinary research team, introduced me to social medicine and since then continuously encouraged me to profile myself rather than joining the crowd. Leif was my PhD supervisor and inspired me to frame my thesis published in 1991 under the provoking concept 'accidentology' (Andersson, 1991). The term was not his own innovation; it existed already in French and other Latin languages, but only sparsely in scientific texts. I never put prestige in defending this concept, given the ruling winds in the field. But in retrospect I cannot refrain from thinking that Dr Svanström's idea was very far-sighted and still worth serious consideration. Defining accidents as unintentional injury events represents a reductionistic assault on a multifaceted field of research, both empirically and theoretically. Suicidologists would never accept the complexity of suicide being reduced to a matter of intentional self-directed injury. So why should 'accidentologists' accept their field being reduced to unintentional injury?

Note

1. Key references include works such as Hale & and Glendon (1987), Reason (1997), Hollnagel (2004), and Perrow (1984).

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