

The sociology of sleep and the measure of social acceleration

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Abstract

Within Western contemporary social thought, the claim that social acceleration is a key feature of the late-modern world has been widely circulated. A criticism of this argument is that it is often based on conjecture and hyperbole instead of on actual empirical evidence (Rosa and Scheuerman, 2009; Wajcman, 2008). A viable way to subject the social acceleration argument to a higher degree of empirical scrutiny is to deploy the sociological study of sleep as a key indicator. Such an insight builds upon research in the nascent sociological study of sleep, which has established how some developments in people's sleep lives may signal broader shifts in the socio-temporal order (e.g. Baxter and Kroll-Smith, 2005; Melbin, 1987; Williams, 2005, 2011). I contribute to this emerging body of literature by emphasizing the importance of being sufficiently precise and nuanced when sleep research is deployed as a measure of the social acceleration phenomenon. I appeal to Hartmut Rosa's theory of social acceleration (2003) as a way to advance a more explicit, multi-faceted and open-ended understanding of the social acceleration concept. Rosa's theory is unique because it identifies three distinct facets of the concept that can be empirically grounded. By undertaking an exploratory study of what evidence regarding people's sleep lives can be used to test these three facets, I find that this yields a more discontinuous and context-driven view of social acceleration.

Keywords

Sleep research, social acceleration, sociology of sleep, speed, temporality

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Introduction

In the early years of the 21st century, it has become commonplace for social thinkers in the Western world to proclaim that ours is a time of ‘social acceleration’, whereby most aspects of contemporary social life are becoming ‘faster’ (e.g. Agger, 2004; Bertman, 1998; Eriksen, 2001; Gleick, 1999; Kreitzman, 1999). Yet, a valid criticism made of this argument is that it has been overly based on conjecture and hyperbole instead of on actual empirical evidence (Rosa and Scheuerman, 2009; Wajzman, 2008). Subsequently, this is why claims about the existence and effects of the social acceleration phenomenon need to be subjected to a higher degree of empirical scrutiny.

In this paper, I propose that it is valuable to use sociological research on sleep to empirically verify the social acceleration thesis. The basis for this interchange is that the social acceleration process is determined by – and also determining of – bodily states and practices that involve sleep. This means that it is possible to ascertain the extent to which the social acceleration process is at work through an investigation of people’s sleep lives.

Such an insight builds upon a few key pieces of research in the nascent sociological study of sleep, which have sought to demonstrate how an analysis of people’s sleep lives can be indicative of broader shifts in the socio-temporal order (e.g. Baxter and Kroll-Smith, 2005; Melbin, 1987; Pugh, 2000; Williams, 2005, 2011). I contribute to this emerging body of literature by emphasizing the importance of being sufficiently precise and nuanced when sleep research is deployed as a measure of the social acceleration phenomenon. What we need is a more clearly defined understanding of the social acceleration concept. We also need to be open to the possibility that sleep research may not confirm the social acceleration thesis in a wholly one-sided manner.

Towards this end, I introduce Hartmut Rosa’s (2003) conceptual framework of social acceleration, which posits that the process involves three interrelated and empirically verifiable features. By conducting an exploratory study of what evidence regarding people’s sleep lives can be used to test these three facets, I argue that a more solidified and sophisticated view of social acceleration emerges. Whereas many accounts of social acceleration depict it either as a linear, inexorable or all-encompassing phenomenon, I find that an analysis of the existing sociological sleep data yields a more discontinuous and context-driven understanding of social acceleration.

The social acceleration thesis and the sleeping body

As part of the growing awareness within contemporary social thought that temporality is a key aspect of social life,¹ how quickly or slowly people live

their lives has increasingly become a more significant issue.² In debates about contemporary society, there are many social researchers and social commentators who assert that nearly everything in the contemporary Western world has been speeding up (e.g. Agger, 2004; Bertman, 1998; Gleick, 1999; Kreitzman, 1999). This 'accelerative' trend is said to have bearing on just about every aspect of social life, from intimate relationships and fashion clothing cycles to transportation technologies and political decision-making practices. However, according to Judy Wajcman (2008), these and other accounts of social acceleration tend to be based on mere speculation and extrapolation instead of on actual empirical evidence. Wajcman thus wishes to advance a more empirically grounded understanding of the social acceleration phenomenon.

When empirically testing the social acceleration argument, it is important to consider that social acceleration has a bodily dimension. On the one hand, social acceleration is a force which affects how the body is organized, so that some bodily states and regimes are privileged over others. On the other hand, social acceleration must proceed *through* the body, so that bodily capabilities and limitations inform the parameters of the speeding up process (Rosa and Scheuerman, 2009: 6). My argument here is that sleep also manifests this Janus-faced quality of social acceleration. While social acceleration affects how people sleep, it is also true that the speed which societies can reach is partly informed by people's capacity to sleep in specific ways. Therefore, sleep can serve as a key indicator of the social acceleration phenomenon – much in the same way that transportation has served as one of the key barometers of the social acceleration process (e.g. Harvey, 1989; Simonsen, 2005).

Although the issue of sleep has not figured much in the existing literature on the theme of social acceleration,³ there are some pieces of research that have attempted to forge such a link, which we can draw fruitfully from. What some studies of social acceleration have shown is how the trend to devote less time to sleep can serve as evidence that the contemporary Western world has been accelerating (e.g. Agger and Shelton, 2007: 90–94; Gleick, 1999: 121–122; Scheuerman, 2002: 360). A similar argument has also been developed by some of those engaged in the nascent sociological study of sleep, who have primarily sought to attribute the growing pressure in the Western world to devote less time to sleep to the rise of a '24/7' non-stop culture (Baxter and Kroll-Smith, 2005; Melbin, 1987; Pugh, 2000).

But while these studies astutely establish how developments in people's sleep lives may signal broader shifts in the socio-temporal order, they almost all overlook the possibility that sleep research might not corroborate the assertion that the contemporary Western world is becoming a faster place. The work of Simon Williams (2005, 2011), however, is more balanced

in its approach, in that it considers how sleep can in some circumstances act more as a limit to – rather than as an enabler of – the social acceleration process. This relates to the idea that ‘sleep-deprivation... is a widespread and growing problem in contemporary society’ (Williams, 2011: 8). The prevalence of sleep-deprivation is said to be a result of the cultural precept that spending more time awake – and thus less time asleep – is one viable way of increasing productivity. But Williams notes that many sleep experts and social commentators have begun to question the efficacy of this practice, since ‘selling ourselves “short” of sleep’ may in fact lead to more dangerous or accident-prone behaviors (2011: 10). There is, in other words, a reckless quality to the condition of sleepiness, which may then contribute to a *decelerative* trend instead of an accelerative one.

It is to Williams’s credit therefore that his sociological research on sleep promotes a more dynamic understanding of social acceleration by treating the phenomenon as an open-ended empirical question instead of as an accepted fact. Williams’s work is also valuable in that it overtly tries to define what is meant by social acceleration, rather than leaving the concept’s meaning amorphous and implied. In an attempt to identify some of the distinguishing traits of the social acceleration argument, Williams discusses how the phenomenon of ‘fast capitalism’ – an important feature of the contemporary age – is characterized by the ‘*compression of time and the quickening pace of everyday life*’ and by the erosion of the public/private boundary (Williams, 2011: 3, emphasis in original). Williams then suggests that the key factor behind these changes is the heightened expectation of ‘*instantaneity*’. In the context of work, this means that ‘we are all somehow expected to be (more) available’, to work ‘faster’ and/or ‘longer’, and generally to ‘do more in less time’ (Williams, 2011: 4).

Yet, what Williams’s work leaves underdeveloped is how precisely these features of social acceleration can be empirically measured through the prism of sleep research, as Williams does not rigorously spell out how sleep is implicated in the speed-up of contemporary society, apart from the cultural realm. The primary aim of this paper is to expand upon the insights of Williams and others to advance a more comprehensive understanding of how sleep research can serve as a telling indicator of the social acceleration phenomenon. This involves a more explicit, multi-faceted and empirically oriented conceptualization of social acceleration, which Hartmut Rosa’s (2003) theory of social acceleration helps to cultivate.

The accelerated society paradigm

Rosa’s theory of social acceleration is unique because it departs from the way the issue has been left nebulously defined by many social researchers

(Rosa and Scheuerman, 2009; Wajcman, 2008). Rosa sets out a clear and workable definition of social acceleration by dividing it into three analytically and empirically distinct forms (2003: 6). The first measurable form of social acceleration identified by Rosa is 'technological acceleration'. This refers to whether or not a social process runs at a faster speed when compared to earlier time periods. Within this rubric, it is apt to say that social acceleration has occurred if there is a reduction in the amount of time it takes for 'goal-oriented' and 'intentional' processes, like that of 'transport, communication and production', to reach completion (Rosa, 2003). This category of social acceleration is regarded by Rosa to be 'the most obvious... and most measurable form of acceleration' (Rosa, 2003: 6).

The second form of social acceleration identified by Rosa, the 'acceleration of the pace of life', refers to the heightened scarcity of 'free' time which paradoxically occurs when there is a reduction in the amount of time needed to complete social processes (2003: 8–10). This category of acceleration is 'paradoxical' because it seems logical to conclude that 'time should become abundant' if 'technological acceleration means that less time is needed' (2003: 9). However, Rosa intimates that the two forms may in some instances be mutually reinforcing, as the drive to live busier, more productive lifestyles is commonly linked to the speeding up of social processes.

Rosa proposes that measuring the acceleration of the pace of life is both a subjective and objective task. Subjectively, this form of acceleration is measured by the extent to which people 'consider time as scarce' and 'feel hurried and under time pressure and stress' (Rosa 2003: 9). Objectively, this involves the measure of two key indicators. The first of these indicators determines whether or not there has been a 'measurable contraction of the time spent on definable episodes or "units" of action like eating, sleeping, going for a walk, playing, talking to one's family, etc.', so that 'we do *more* things in *less* time' (2003: 9). The second of these indicators ascertains how compressed actions and experiences have become, which involves measuring either if the time it takes to transition from one action to another has become shorter or if there has been an uptick in the number of things that are being done simultaneously, 'like cooking, watching TV, and making a phone call' (Rosa, 2003: 9–10).

Whereas there is a direct connection between the first two types of social acceleration, the third and last form of social acceleration that Rosa identifies, the 'acceleration of society as a whole', shares less of an theoretical overlap, in that its measurement is more concerned with the speed-up *of* society as a whole and less so with that which occurs *within* (Rosa, 2003: 7). The 'acceleration of society as a whole', in other words, is not so much about measuring the speed-up of particular social processes as it is about whether or not 'rates of change themselves are changing' (Rosa, 2003).

But because ‘there is little agreement in sociology as to what the relevant indicators of change are and when alterations or variations actually constitute a genuine or “basic” social change’, this is why it is more difficult to measure ‘the acceleration of society as a whole’ in contrast to the other two forms of acceleration (Rosa, 2003: 7). Rosa offers a work-around by appealing to the temporal framework of Hermann Lübbe, who posits that ‘the past is defined as that which no longer holds/is no longer valid’, ‘the future denotes that which does not yet hold/is not yet valid’, while the present ‘is the time span for which...the horizons of experience and expectation coincide’ (Rosa, 2003: 7). Adopting this view of temporality means that ‘the acceleration of society as a whole’ can be determined if we find that there has been ‘an increase in the decay rates of the reliability of experiences and expectations and by the contraction of the time spans definable as the “present”’ (Rosa, 2003: 7). According to Rosa, this is an empirical investigation which involves the use of the ‘generational’ unit of measurement. This means that if the rate of change for a social realm like work accelerates from an inter-generational pace to a generational or intra-generational one, then it is reasonable to conclude that there has been an acceleration of society as a whole.

In sum, Rosa’s tripartite understanding of social acceleration is beneficial because it frames the social acceleration thesis as an open-ended empirical question instead of as a presumptive fact. It is also beneficial because it recognizes the need for a theoretically complex account of social acceleration which is explicitly – rather than implicitly – formulated. My argument is that the utility of Rosa’s theory of social acceleration also applies to the sociological study of sleep. Thus far, it has been commonplace in the sociological literature as well as in the sleep science literature to affirm the notion that the contemporary social world is becoming faster. This is primarily because there is a growing cultural pressure to shorten the time devoted to sleep (e.g. Chatzitheochari and Arber, 2009; Melbin, 1987; Pugh, 2000). However, appealing to Rosa’s conceptual framework of social acceleration reveals that there are other ways in which the sociological study of sleep can serve as an indicator of the social acceleration process. This is because the measurement of how much time is now being devoted to sleep merely concerns the first form of acceleration in Rosa’s schemata and not the other two.

In the sections that follow, I undertake an exploratory study of what evidence regarding people’s sleep lives can be used to test not just one but all three forms of social acceleration. I find that this yields a more nuanced and sophisticated understanding of the concept, even though some gaps remain in the sociological study of sleep.

Sleep and processual acceleration

Whenever sleep research has been used to affirm the idea that the contemporary social world has gotten faster, it is the technological form of acceleration which has typically received the most attention. Technological acceleration occurs when there is a reduction in the amount of time it takes for 'goal-oriented' and 'intentional' processes, like that of 'transport, communication and production', to reach completion (Rosa, 2003: 6). While not commonly thought of as a 'technological' matter, sleep is able to serve as a key indicator of the technological form of acceleration since it can be construed as a goal-oriented process, which is arguably the core object of measurement for this type of acceleration. This means that the technological – or what I term the *processual*⁴ – form of social acceleration has occurred when there is an observed decline in the average amount of time devoted to sleep.

But has there been a noticeable trend to shorten the average total amount of time devoted to sleep throughout the contemporary modern world? An oft-repeated claim in the sleep science literature is that people nowadays spend less time asleep than their counterparts did about a hundred years ago, with the average sleep duration being roughly 1.5 hours less each daily cycle (e.g. Bixler, 2009; Heslop et al., 2002; Vgontzas et al., 2004). This figure mainly derives from a succinct but highly influential study undertaken by Webb and Agnew (1975). Relying on a piece of research conducted in 1913, Webb and Agnew found that US school children used to sleep around 9 hours on average per daily interval. The two authors then compared this number with the 7.5 hours US children were reported to have slept on average in 1963, thus registering a 1.5 hour difference between the two time periods.

However, it is important to note that many have found fault with the methodology and conclusions of Webb and Agnew's research (Ferrara and De Gennaro, 2001; Harrison and Horne, 1995). What is specifically flawed about Webb and Agnew's analysis is that it fails to recognize how skewed the original 1913 study is likely to have been – a possibility that the original authors had initially acknowledged (Terman and Hocking, 1913). It is questionable to accept the findings of the original US study because the source data varies significantly from the findings of other closely timed studies of German, UK and Japanese children, all of whom slept 1–1.5 fewer hours per daily cycle (Harrison and Horne, 1995: 904; Randler, 2009: 89). This is likely why the 9 hours average sleep time figure is a statistical anomaly, which casts doubt on the premise that average sleep durations have decreased over time in a unidirectional fashion.

Another compelling reason to question such a premise is because the reported decline in people's sleep duration has been frequently overstated and/or oversimplified in the academic literature (Matricciani et al., 2011). Claims asserting a linear reduction in the average amount of time people spend asleep have been widespread, despite evidence which suggests the contrary. Randler (2009), for instance, has found that the average sleep duration of German children and adolescents has actually increased – rather than decreased – over the last hundred years. But Randler's findings also show that there has been a noticeable decline in the sleep length of German children and adolescents starting from the 1970s onwards, even though this decline was not steep enough to overtake the gains made in the preceding interval. Randler's research thus cautions us from adopting an overly expansive timeframe, as this can obscure shorter-term trends which can also be analytically insightful.

However, this may not be such a significant issue if we recognize, as Randler does, the scarcity of longer-term historical data relating to people's sleep lengths. Since the practice of accurately measuring sleep quantity is largely confined to the past few decades, it becomes inappropriate to make such specific claims about the amount of sleep people used to get in earlier time periods when compared to the contemporary era. Little is to be gained, in other words, from contrasting the quantity of sleep people experience in the present day with that of the time before the 20th century, due to the dearth of usable data for the latter interval.

By contrast, it may be more fruitful to make longer-term historical comparisons, as Williams argues (2011: 13), when it comes to the measurement of sleep quality, as there is a greater amount of data pertaining to this issue. Social researchers who have begun to gather this data have found that the quality of sleep in the contemporary era seems to be 'better' in comparison to what sleep was like in previous eras (e.g. Ekirch 2001, 2005; Klug 2008). Roger Ekirch (2001, 2005), for instance, has outlined what disruptive sleeping conditions were commonly encountered by many poor western European urbanities during the early modern period. These sleep environments were frequently overcrowded, dangerous, unhygienic and uncomfortable, as they were also scarce. This depiction of what sleep used to be like can be contrasted with the kind of sleep that is commonly experienced in the less disruptive housing environments of the present day. What some influential studies show, for example, is that there has been a dramatic decrease since at least the mid-19th century in the average number of people who reside together in the same room (e.g. Burnett, 1986: 331; Valuch, 2001). If we can use the overcrowdedness of urban housing to partly explain why sleep disruptions were so frequent during the early modern era, then this

may plausibly indicate that less time is nowadays being devoted to sleep in the Western world.

But there also are reasons to refrain from ascribing too much significance to this link. The first is that even though household overcrowding has been identified as a cause of disrupted sleep (e.g. Conley, 2001: 265; Hale, 2005), this is by no means the only determinant of a person's sleep quality, as other factors include the dwelling's temperature, light fixtures, exposure to disruptive noises and bedding arrangements. The reported decline in household overcrowding also largely fails to take into account the homeless population, whose sleep is frequently open to disruption (Rensen, 2003). This oversight is significant because the decline in average household density may in some cases be offset by the increase in the number of people that are homeless. Further complicating matters is the lack of solid empirical data concerning the homeless population, as they tend to be ignored or undercounted in large-scale demographic studies (Koegel et al., 1996). This then lowers the explanatory value of using household density as a determinant of sleep quality. While using such a measure can still be telling or suggestive, it is by no means definitive.

Correspondingly, the relationship between sleep quality and sleep quantity should be understood in a similar fashion. While more historical data appears to exist concerning how people slept differently from era to era (Williams, 2011), this evidence is suggestive at best. This is because an improvement in sleep quality does not absolutely entail there will be a decline in sleep quantity, by virtue that the former is only a contributing – and not sufficient – component of the latter. We should be wary then of claims which posit that there has been a long-term linear decline in the average amount of time being devoted to sleep in the Western world, for there is not enough scientific evidence to establish if this has wholly been the case.

By contrast, claims based on shorter-term trends may be more reliable, given that there is more quantifiable data which directly addresses this issue. However, here too is where we need to exercise a degree of analytical modesty. Even though there is a strong case to be made that the average amount of time devoted to sleep in the Western world has been declining ever since the start of the 20th century (e.g. Matricciani et al., 2012), the existing evidence is still insufficient to establish such a trend in all sectors of the population. It is also important to acknowledge that there is a considerable amount of regional variation, with some countries reporting increases – instead of decreases – in average total sleep durations (e.g. Hofferth and Sandberg, 2001; Randler, 2009). Additionally, variation also exists between different sectors of the same populace, as British working men, for example, have been found to be more likely than their female counterparts 'to obtain

under 6.5 hours of sleep on a typical working day' (Chatzitheochari and Arber, 2009: 44). These factors, consequently, demonstrate why a more delimited and context-specific approach is needed.

Thus when it comes to using sleep as an indicator of the processual form of social acceleration, there does not appear to be enough evidence to substantiate the claim that the average amount of time devoted to sleep has experienced a linear decline ever since the early modern period. This especially pertains to the measurement of people's sleep *quantity*. Not only is there a dearth of empirical data about how much people used to sleep on average before the 20th century, but also the scientific evidence of whether or not average sleep lengths have declined from the start of the 20th century onward is not overwhelmingly one-sided (Matricciani et al., 2011). Conversely, where it may be more appropriate to identify longer-term historical trends is in the measurement of sleep quality. Yet, such a measurement also has its limitations. The first concerns the sparse amount of research that has been conducted on this front, as the social scientific study of how well people sleep has frequently lacked a historical dimension (Ekirch, 2001: 344). The second is that all observed historical improvements of sleep quality do not always result in a decline in sleep quantity, since the former is only a contributing component of the latter.

These findings in turn suggest that the processual form of acceleration needs to be thought of in more discontinuous and complex terms. What the preliminary evidence indicates is that the move to devote less time to sleep has not solely been a downward trending process, which gives credence to Simonsen's assertion that we ought to break up and 'unstraighten' 'the linear narrative of speed and acceleration' (2005: 99).⁵

Sleep and the acceleration of the pace of life

Another way in which sleep research can be used to verify the social acceleration thesis is to establish whether there has been an 'acceleration of the pace of life' with regards to how sleep is socially patterned. There are at least two key components involved with this type of inquiry. The first has to do with the measurement of the average amount of time it takes to transition from sleep to activities found in the waking world which are categorized as being productive. If there is a decrease in this amount of time, then it is apt to say that the acceleration of the pace of life has occurred, as the latter is meant to track when there has been a reduction in 'free' time (Rosa, 2003: 8–10). This component of the acceleration of the pace of life can be aptly termed the 'transitory' dimension of social acceleration.

One method which can be used to determine if there has been a reduction in the average amount of time it takes to transition from sleep to

'productive' activities found in the waking world is to track the shifting boundary between work and home life. Of particular relevance here is the oft-made observation that the separation between home and work is no longer as well defined as it once was, especially for those living in the contemporary Western world. Such a shift has occurred, according to some social thinkers, because the 'place' of work is no longer as strongly fixed to one particular locality (Felstead et al., 2005: 415), nor is the time of work confined to one particular interval (Tietze and Musson, 2002).

With regards to sleep, this spread of work to other arenas is significant because it means that the proximity between sleep and work has possibly gotten closer, as the time and distance it takes to switch back and forth between the two spheres may be decreasing. But how might this claim be substantiated one way or the other? Although no one has yet conducted a longitudinal study of the average amount of time it takes for people to engage in other activities once they have awoken, there are some suggestive pieces of research that should not be oversold or overstated, since they either originate from non-academic sources or only deal with sleep in a peripheral manner. These studies contain insightful clues about how the transitory dimension of social acceleration might be empirically verified through the nexus of sleep research.

A 2008 study commissioned by Sheraton Hotels regarding Blackberry smartphone usage in the US is one of these insightful studies. There, it was found in a telephone survey of 'approximately 1500 American adults who are professionally employed' that 84 percent of them check their personal digital assistants (PDAs) 'just before going to bed and as soon as they wake up' (PRWeb 2008). The survey also found that 85 percent of study participants 'sneak a peak [sic] at their PDA in the middle of the night' and that 80 percent of them 'check their e-mail before morning coffee' (PRWeb 2008). Because this study was neither peer-reviewed nor published through a conventional scholarly outlet, it is difficult to know how reliable these findings actually are. But at the very least, what the study does reveal are the types of queries to be posed if we desire a deeper understanding of how work and sleep are related in the contemporary era.⁶ This involves exploring the extent to which the social sphere of work has spread into spaces and times previously devoted to sleep.

However, research on this front has been limited to a handful of qualitative studies that have sought to record some of the workplace changes associated with new information and communication technologies (ICT). Francine Schlosser's qualitative study of 11 Canadians 'representing three organizations in the public and private sector', for example, has found that the 'the emergence of wireless communication' has in part 'created expectations to be on call 24 hours a day, seven days a week' (2002: 413–414).

Similarly, Melissa Mazmanian et al.'s qualitative study (2006: 5) of 'a small, prestigious firm in the Northeast [of the US]' has found that its workers are now expected to stay in contact during 'each moment of the day (and some in darkest night)'. Correspondingly, this falls in line with Ryan Aipperspach et al.'s finding (2008: 222) that the home environment is now more 'heterogeneously' purposed, which explains why 'laptops and PDAs connected wirelessly to the office may be placed on a bedside table, providing access to work late at night'. Still, a shortcoming of these and other studies is that the issue of sleep is only ever peripherally considered. This leads us to extrapolate that the social sphere of work has recently crossed over into spaces and times previously associated with sleep, without us knowing more explicitly if this has been the case.

To advance our understanding of how work and sleep are related in the contemporary era, it is also necessary to consider how the social sphere of sleep has encroached onto spaces and times that have been conventionally associated with work. According to some social researchers, this shift is principally marked by the recent change in attitudes towards workplace napping (e.g. Baxter and Kroll-Smith, 2005; Brown, 2004; Hancock, 2008). Whereas previously, workplace sleeping was regarded as being 'taboo' especially under the Taylorist definition of work – Vern Baxter and Steven Kroll-Smith present some preliminary evidence to suggest that a 'new cultural frame is emerging, one that valorizes the workplace nap' (2005: 40). Baxter and Kroll-Smith posit that one of the main drivers of this new attitude towards workplace napping is the growing awareness that poor sleep typically translates into a less potent and capable workforce. Workplace napping, from this perspective, is meant to help remedy such a problem because it has been shown to increase the alertness of workers who are drowsy or soporific.

Within sociology, a fair amount of research has been undertaken to establish that there is a growing cultural trend in the contemporary Western world to re-describing workplace napping as an economically advantageous practice (Brown, 2004; Hancock, 2008: 417–418). But whether or not the experience of workplace napping has actually become more prevalent has been less well explored. The few studies which have tried to quantify how widespread the practice has become have all been conducted by non-academic entities (Circadian Technologies Incorporated, 2002; National Sleep Foundation, 2008; Society for Human Resource Management, 2001). Moreover, with the notable exception of the 2008 'Sleep in America' poll conducted by the National Sleep Foundation, these studies only investigate whether workplace napping is formally allowed or facilitated by employers, without establishing if workers actually make use of such an opportunity. It is this latter line of inquiry, however,

that is most telling about the extent to which the distance between work and sleep has been closed. Hence, our understanding of how work and sleep are related remains preliminary.

Besides the transitory dimension of social acceleration, another key component of using sleep research to measure the acceleration of the pace of life concerns whether or not sleep is now done *concurrently* with other activities. This type of sleep research is based on Rosa's observation that the acceleration of the pace of life also involves an increase in the number of things that are done simultaneously, 'like cooking, watching TV, and making a phone call' (2003: 9–10). But it is not immediately apparent how sleep research is able to corroborate this 'overlapping' dimension of social acceleration, since sleep is commonly characterized by a reduced level of consciousness and the partial immobilization of the sleeper's body (Leder, 1990). How then would it be possible for someone in such a state to be engaged with other activities?

While it is important to recognize that sleep belongs to a different order of experience which normally inhibits the sleeper from partaking in certain types of actions, there are still some activities which the sleeping person can be a part of. One of these involves the practice of sleeping while in transit, which is relatively commonplace in the contemporary Western world. For the purpose of measuring the overlapping dimension of social acceleration, what interests us here is if sleep has become *more* conducive while on certain modes of travel.

The commuter railway is one of these modes of transit where we can make such a query.⁷ Here again, we encounter a porous amount of empirical data. To date, no one has yet conducted a comparative study on how prevalent sleep on passenger train rides has become in contrast to other time periods. At best, what we have are some historical accounts that peripherally illuminate how conducive to sleep some modes of transportation may have been. In the case of the railway journey at the start of the 19th century in Western Europe, this experience was often described as being fraught with bodily disruptions (Schivelbusch, 1986). For example, according to one passenger's account written in 1838, it was almost impossible 'to conduct a conversation with one's neighbor' because of the loud recurrent noises produced by the wheels sliding against the railway tracks (Schivelbusch, 1986: 114).

It was only in latter half of the 19th century that more efforts were undertaken to dramatically improve the railway transit experience. Starting from this time, larger British railway companies 'began to introduce much bigger and more comfortable passenger coaches than the old standard six-wheeler...which improved the springing and the "ride"' (Perkin, 1970: 278). Historical accounts also record that there were

concerted attempts to make the railway carriage a more restful and secure environment, as typified by one railway company's move to 'include heating and padded seats instead of wooden benches' in an effort to 'pioneer comfort for third-class passengers' (Perkin, 1970: 278–279).

Although these historical accounts provide us with points of comparison about how comfortable railway passengers used to be in erstwhile time periods, they still do not directly address how conducive to sleep these moving environments were. Hence, even if a case can be made that the average passenger experience on the railway is substantially less disruptive today than it was over a century and a half ago, we can only loosely infer from this data that sleep is now more conducive for those in railway transit.

Another analytical shortcoming here has to do with the time frame of the comparison. A longer-term comparative study runs the risk of obscuring shorter-term trends which may be just as revealing. In fact, there may not be such a long and linear trend to make railway carriages more conducive to sleep, if we consider that the design of some British railway carriages has grown less concerned with the bodily comfort of its passengers in recent decades (Bissell, 2009: 436–437). Whereas seats in older vehicles were soft and sprung, David Bissell observes that 'the specifications of seats in new vehicles' now tend to be harder and more densely positioned next to one another (2009: 437).

But Bissell also stresses that this recent move to make seating less comfortable – and thus less conducive to sleep – should not be viewed as a uniform or totalizing process. Even though some railway carriages may not be as comfortable as they previously were, some passengers still find a way to sleep in such circumstances, as some studies report (Jensen, 2012; Lyons et al., 2007). It is also important to consider the experience of those in 'first-class' carriages. The seating of these spaces tend to 'have more substantial armrests and headrests and are covered in more luxurious materials that effectively enclose around the body, encouraging the body to withdraw' (Bissell, 2009: 437).

This hierarchy of comfort in transit spaces raises a broader issue about using sleep research as a key indicator of the acceleration of the pace of life: that the social acceleration thesis likely pertains more to some groups than it does for others. This point especially bears on the previous discussion around the relationship between work and sleep in the contemporary era. While it may be the case that some spaces are now more 'heterogeneously' purposed to allow a faster transition between sleep and work, this is not true for all lines of work. Accordingly, this means we need to recognize that the social acceleration phenomenon is marked by a certain amount of social division (e.g. Eriksen, 2007; Nowotny, 1994). Social acceleration is an

uneven process that reflects and refracts how power is subdivided, expressed and reproduced within a given society (Munkler, 2009; Tiessen, 2006).

Sleep and the acceleration of society as a whole

Within Rosa's paradigm, the last form of social acceleration which can be empirically verified through the prism of sleep research is the 'acceleration of society as a whole'. If we recall Rosa's deployment of the 'generational' as a way to measure the rate of change itself (2003: 7), sleep can be deployed as key indicator of this form of social acceleration if it is established that sleep practices are no longer as slow-changing as they once were.

There are many viable ways to pursue this line of inquiry. For example, in order to ascertain if sleep practices are now more susceptible to change, we might focus on the discursive realm to determine if people's optimal way of sleeping has become a more variable matter. Or we might try to determine if sleep surfaces are now more frequently replaced than they were in erstwhile time periods. In both of these cases, however, our knowledge is partly limited by the amount of empirical research that has been undertaken.

When it comes to the rate of change in the discursive realm, there are only a handful of historical studies that pertain to this issue. The most telling of these was conducted by Peter Stearns et al. (1996), who uncovered a historical shift in the way American children were told to sleep. Stearns et al. report that 'sleep issues did not loom large before or during the middle decades of the 19th century', as sleep was not a prescient topic in medical or popular texts (1996: 345). It was only in the early 20th century that parents were prompted to worry about how their children slept. Correspondingly, this suggests that the discourse surrounding children's sleep prior to the 20th century used to operate under the temporal regime of 'glacial time', which denotes when change 'occurs across generations' and is 'extremely slow-moving and ponderous' (Urry, 2009: 194).

By contrast, some sociological studies posit that there are now more frequent shifts concerning how children's sleep is discussed. This has much to do with the 'growing concerns and anxieties in professional and popular culture that children are not getting "enough" sleep' (Williams et al., 2007: 3.2), which has in turn led to the advent and proliferation of new strategies that aim to help parents shape and manage their children's sleep in the best way possible (Seale et al., 2007). These findings, however, are only preliminary in that they do not explicitly flesh out what many of these new anxieties or strategies are, nor do they address whether or not in actual practice children's sleep is changing at a faster rate.

Likewise, when it comes to measuring how long sleep surfaces are thought to last for before they are replaced, scholarship on this issue has also been sparse and introductory. What little historical research has been conducted about beds in erstwhile time periods reveals is that beds were less frequently replaced a few centuries ago because they were items of high cost – relative to one's total assets – and they often lasted between and across generations (Ekirch, 2005: 275–276).⁸ This can be contrasted with the finding that the average age of a bedroom mattress in the early 21st century tends to be between eight and ten years old (Jacobsen et al., 2010; Zock et al., 2006). Still, there are many shortcomings involved with this comparison. Firstly, research on the average length of time it takes to replace a mattress has been mainly based on small sample sizes, which can lead to misleading results. Secondly, this research has lacked a longitudinal component, which prevents us from establishing whether the rate of change for sleep surfaces has increasingly grown faster or conversely if any counter trends can be detected.

Conclusion

Building upon the insight that some developments in people's sleep lives can be indicative of broader shifts in the socio-temporal order (Baxter and Kroll-Smith, 2005; Melbin, 1987; Pugh, 2000; Williams, 2005, 2011), I have attempted in this paper to advance a more comprehensive and sophisticated understanding of how sleep research can serve as a telling indicator of the social acceleration process. A key part of this project has been to introduce and to unpack Rosa's tripartite theory of social acceleration (2003), which identifies three distinct facets of the concept that can be empirically examined.

I have sought in this paper to conduct an exploratory study of what evidence regarding people's sleep lives can be used to test each of these three facets, which has yielded a number of important findings. The first concerns the porous amount of social scientific data on sleep that has thus far been collected. Although it is often claimed that the declining length of time devoted to sleep in the contemporary Western world is something which substantiates the social acceleration argument, there is not enough evidence to wholly support this analysis. Not only are there gaps in the comparative historical study of people's sleep lives, but also there is a fair amount of conflicting evidence, which casts doubt on the 'linear narrative of speed and acceleration' (Simonsen, 2005: 99).

This paper also finds that most trends relating to people's sleep lives apply more to some groups than they do to others. This finding further validates the view that the social acceleration phenomenon is marked by a

degree of social division, as social acceleration reflects and refracts how power relations are organized (Munkler, 2009; Tiessen, 2006). Therefore, when discussing either the social acceleration process or people's sleep lives, it is prudent to take a more delimited and context-specific approach.

As the 21st century enters its second decade, there are many signs to suggest that sleep is no longer such a neglected topic within sociology as it once was (Williams et al., 2010). While the emerging sociological study of sleep has begun to establish itself as a valuable source of empirical data, this paper finds that some aspects of people's sleep lives still remain understudied, especially when it comes to the issue of social acceleration. As this paper has established, what is worth further investigation is where, when, how, and to what extent sleep occurs outside the home setting, since these measures help us to determine how pronounced some features of the social acceleration have – or have not – become. It is also worth learning more about what activities, technologies and expectations typically surround sleep areas and sleep intervals, as this can expand what we know about the relationship between sleep and work in the contemporary era. Sociological sleep research also benefits from having a more prominent historical component, which helps to ensure that claims relating to sleep trends are sufficiently sourced and delimited. I suggest that by extending these and other related lines of sleep research, we stand to generate a more well-founded and comprehensive understanding of the social acceleration phenomenon.

In highlighting how sleep research can be deployed as a key indicator of the social acceleration process, my aim here however has not been to frame empiricism as a panacea for all of the shortcomings of the social acceleration debate. According to Robert Hassan (2010), why we ought to avoid adopting an overly dismissive view of theory-based research is because there are limitations to what either theory or empiricism can do by themselves to deepen our understanding of the social acceleration concept. Hassan insightfully suggests that more theoretical work on social acceleration is needed because the empirical measurement of social acceleration periodically requires conceptual innovation and refinement in order to capture all of the novel complexities that the phenomenon involves. But equally, Wajcman (2010) warns against downplaying the importance of empirically driven research, which is integral in bringing about a more situated and nuanced view of social acceleration.

In this paper, I have sought to show how sleep research can help strengthen the 'dialectic between theory and empirically grounded sociology' (Wajcman, 2010: 377) insofar as the issue of social acceleration is concerned. While I have established that sleep research can be used to generate a more empirically informed understanding of social acceleration,

I have also highlighted the value of adopting a conceptually sophisticated theory of social acceleration that better encapsulates what the phenomenon entails.

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Notes

1. For an authoritative survey of texts that underscore the need to take the issue of time more seriously in the social sciences, it is useful to consult the work of Barbara Adam (1990).
2. Hartmut Rosa and William Scheuerman's volume *High Speed Society* (2009) provides an informative account about how social acceleration has become a more noteworthy issue in debates about contemporary society. They note the contributions of various scholars, who have each in their own way stressed the analytical importance of speed in social analysis. David Harvey's concept of 'time-space compression' (1989), for instance, has played an influential role in identifying how the organization of time and space has been accelerated in post-modern capitalist societies. Likewise, the noted work of urban and cultural theorist, Paul Virilio, has been instrumental in advancing the study of speed, 'dromology', in its many facets (see John Armitage's *Virilio Now* (2010) for an instructive overview of Virilio's oeuvre).
3. For example, nowhere in Stephen Bertman's (1998) text on the pervasiveness of 'hyperculture' is sleep discussed at any length. So too is sleep largely absent in the corpus of Paul Virilio's work, spanning over 30 years and resulting in at least 20 books translated into the English language – except for a few passing remarks about how the sleep physiology of many urban dwellers can be adapted for high speed lifestyles (2000: 4–5). Sleep is also largely nowhere to be found in Thomas Hylland Eriksen's (2001) text on contemporary Western society's newfound 'infatuation' with the present moment, William Scheuerman's (2004, 2005) writings on the speed up of liberal democracy, John Tomlinson's (2007) cultural study of speed and Ben Agger's (2004) research into the 'speeding up of fast capitalism'.
4. The main reason why I opt to refer to the 'technological' form of social acceleration as the 'processual' form is because 'processual' is a far broader term that encompasses – but is not limited to – the technological realm. Technology is a contested concept in the social sciences and its meanings are manifold. However, a commonplace definition of technology associates it with the 'equipment' or 'hardware' that people use to be more productive (Orlikowski, 1992: 399). By using the term, 'processual', we avoid such narrow associations, without dismissing how technology is involved with social acceleration.
5. According to Simonsen (2005), a more sophisticated understanding of social acceleration emerges if we can recognize how there are a number of historical

- contradictions, discontinuities and reversals associated with the social acceleration process.
6. Michael Savage and Roger Burrows's warning of the 'coming crisis of empirical sociology' (2009) gives us further reason to treat these non-academic studies as potentially fruitful sources of scholarly data. Savage and Burrows argue that 'sociologists, are losing whatever jurisdiction [they] once had over the study of the "social" as the generation, mobilization and analysis of social data become ubiquitous' (2009: 763). Consequently, sociologists are left with two choices: 'the option of differentiating themselves entirely from these kinds of "contaminated" data sources . . . or seeking to get their hands "dirty" by exploring the potential of such methods' (2009: 766–767). Savage and Burrows argue in favor of the latter option.
 7. To be sure, I could also have selected commercial airplane travel and commuter bus rides to investigate if sleep has become more conducive on those modes of transportation. The reason I have chosen to focus solely on railway travel is for the sake of brevity.
 8. This mainly derives from Ekirch's historical research into the bedding arrangements of western Europeans that were commonplace during the 16th and 17th centuries. For much of this time period, Ekirch reports that beds were often regarded as extremely precious items, as they commonly represented 'over one-third the value of all domestic assets' in modest homes (2005: 276). Correspondingly, 'beds were among the first items bequeathed in wills to favored heirs as well as first possessions purchased by newlyweds' (2005: 275).

References

- Adam B (1990) *Time and Social Theory*. Cambridge: Polity Press.
- Agger B (2004) *Speeding Up Fast Capitalism*. Boulder: Paradigm Publishers.
- Agger B and Shelton BA (2007) *Fast Families, Virtual Children*. Boulder: Paradigm Publishers.
- Aipperspach R, et al. (2008) The heterogeneous home. *Proceedings of the 10th International Conference on Ubiquitous Computing* 222–231.
- Armitage J (ed.) (2010) *Virilio Now: Current Perspectives in Virilio Studies*. Cambridge: Polity Press.
- Baxter V and Kroll-Smith S (2005) Normalizing the workplace nap: Blurring the boundaries between public and private space and time. *Current Sociology* 53(1): 33–55.
- Bertman S (1998) *Hyperculture: The Human Cost of Speed*. London: Praeger Publishers.
- Bissell D (2009) Travelling vulnerabilities: Mobile timespaces of quiescence. *Cultural Geographies* 16(4): 427–445.
- Bixler E (2009) Sleep and society: An epidemiological perspective. *Sleep Medicine* 10(1): S3–S6.
- Brown M (2004) Taking care of business: Self-help and sleep medicine in American corporate culture. *Journal of Medical Humanities* 25(3): 173–187.
- Burnett J (1986) *A Social History of Housing, 1815–1985*. London: Methuen.

- Chatzitheochari S and Arber S (2009) Lack of sleep, work and the long hours culture: Evidence from the UK Time Use Survey. *Work, Employment and Society* 23(1): 30–48.
- Circadian Technologies Incorporated. (2002) *Shiftwork, Health, and Ergonomics*. Cambridge: CTI Publishing.
- Conley T (2001) A room with a view or a room of one's own? Housing and social stratification. *Sociological Forum* 16(2): 263–280.
- Ekirch AR (2001) Sleep we have lost: Pre-industrial slumber in the British Isles. *The American Historical Review* 106(2): 343–386.
- Ekirch AR (2005) *At Day's Close: Night in Times Past*. New York: W.W. Norton and Company.
- Eriksen TH (2001) *Tyranny of the Moment: Fast and Slow Time in the Information Age*. London: Pluto Press.
- Eriksen TH (2007) *Globalization: The Key Concepts*. New York: Berg.
- Felstead A, et al. (2005) The shifting locations of work: New statistical evidence on the spaces and places of employment. *Work, Employment and Society* 19(2): 415–431.
- Ferrara M and De Gennaro L (2001) How much sleep do we need? *Sleep Medicine Reviews* 5(2): 155–179.
- Gleick J (1999) *Faster: The Acceleration of Just About Everything*. New York: Pantheon Books.
- Hale L (2005) Who has time to sleep? *Journal of Public Health* 27(2): 205–211.
- Hancock P (2008) Cultures of sleep: Organization and the lure of dormancy. *Culture and Organization* 14(4): 411–424.
- Harrison Y and Horne JA (1995) Should we be taking more sleep? *Sleep* 18(10): 901–907.
- Harvey D (1989) *The Condition of Postmodernity*. Oxford: Blackwell.
- Hassan R (2010) Social acceleration and the network effect: A defence of social 'science fiction' and network determinism. *The British Journal of Sociology* 61(2): 356–374.
- Heslop P, et al. (2002) Sleep duration and mortality: The effect of short or long sleep duration on cardiovascular and all-cause mortality in working men and women. *Sleep Medicine* 3(4): 305–314.
- Hofferth S and Sandberg J (2001) Changes in American children's time, 1981–1997. In: Owens T and Hofferth S (eds) *Children at the Millennium*. New York: Elsevier Science, pp. 193–229.
- Jacobsen BH, et al. (2010) Effect of prescribed sleep surfaces on back pain and sleep quality in patients diagnosed with low back and shoulder pain. *Applied Ergonomics* 42(1): 91–97.
- Jensen HL (2012) Emotions on the move: Mobile emotions among train commuters in the Southeast of Denmark. *Emotion, Space and Society* 5(3): 201–206.
- Klug G (2008) Dangerous doze: Sleep and vulnerability in medieval German literature. In: Brunt L and Steger B (eds) *Worlds of Sleep*. Berlin: Frank & Timme, pp. 31–52.

- Koegel P, et al. (1996) Enumerating homeless people: Alternative strategies and their consequences. *Evaluation Review* 20(4): 378–403.
- Kreitzman L (1999) *The 24 Hour Society*. London: Profile Books.
- Leder D (1990) *The Absent Body*. Chicago: The University of Chicago Press.
- Lyons G, et al. (2007) The use of travel time by rail passengers in Great Britain. *Transportation Research Part A: Policy and Practice* 41(1): 107–120.
- Matricciani L, et al. (2011) A review of evidence for the claim that children are sleeping less than in the past. *Sleep* 34(5): 651–659.
- Matricciani L, et al. (2012) In search of lost sleep: Secular trends in the sleep time of school-aged children and adolescents. *Sleep Medicine Reviews* 16(3): 203–211.
- Mazmanian M, et al. (2006) Ubiquitous email: Individual experiences and organizational consequences of Blackberry use. *65th Annual Meeting of the Academy of Management*. Atlanta, GA (USA), pp.1–6.
- Melbin M (1987) *Night as Frontier: Colonizing the World after Dark*. New York: Free Press.
- Munkler H (2009) Temporal rhythms and military force: Acceleration, deceleration, and war. In: Rosa H and Scheuerman WE (eds) *High Speed Society: Social Acceleration, Power and Modernity*. University Park: The Pennsylvania State University Press, pp. 243–260.
- National Sleep Foundation (2008) *Sleep in America Poll: Summary of Findings*. Available at: <http://www.sleepfoundation.org/sites/default/files/2008%20POLL%20SOF.PDF> (accessed 3 September 2012).
- Nowotny H (1994) *Time: The Modern and Postmodern Experience*. Cambridge: Polity Press.
- Orlikowski W (1992) The duality of technology: Rethinking the concept of technology in organizations. *Organization Science* 3(3): 398–427.
- Perkin H (1970) *The Age of the Railway*. London: Panther.
- PRWeb (2008) Sheraton San Diego Hotel & Marina celebrates the first global-out-of-office-day and its Link@Sheraton with a special two 'Linkins' weeknight rate of \$5.01 per night. Available at: <http://www.prweb.com/releases/2008/09/prweb1330304.htm> (accessed 10 August 2012).
- Pugh A (2000) Sleep in a sleepless age: A sociology of sleep, work and family. In: Balka E and Smith R (eds) *Women, Work and Computerization*. Boston: Kluwer Academic Publishers.
- Randler C (2009) Sleep length in German children and adolescents. *Somnologie* 13(2): 89–91.
- Rensen P (2003) Sleep without a home: The embedment of sleep in the lives of the rough-sleeping homeless in Amsterdam. In: Steger B and Brunt L (eds) *Night-time and Sleep in Asia and the West*. London: RoutledgeCurzon, pp. 87–107.
- Rosa H (2003) Social acceleration: Ethical and political consequences of a desynchronized high-speed society. *Constellations* 10(1): 3–33.
- Rosa H and Scheuerman WE (2009) Introduction. In: Rosa H and Scheuerman WE (eds) *High Speed Society: Social Acceleration, Power and Modernity*. University Park: The Pennsylvania State University Press, pp. 1–29.

- Savage M and Burrows R (2009) Some further reflections on the coming crisis of empirical sociology. *Sociology* 43(4): 762–772.
- Scheurman WE (2002) Constitutionalism in an age of speed. *Constitutional Commentary* 19: 353–390.
- Scheurman WE (2004) *Liberal Democracy and the Social Acceleration of Time*. Baltimore: The Johns Hopkins University Press.
- Scheurman WE (2005) Busyness and citizenship. *Social research: An International Quarterly* 72(2): 447–470.
- Schivelbusch W (1986) *The Railway Journey*. New York: Berg.
- Schlosser FK (2002) So, how do people really use their handheld devices? An interactive study of wireless technology use. *Journal of Organizational Behavior* 23(4): 401–423.
- Seale C, et al. (2007) Media constructions of sleep and sleep disorders: A study of UK national newspapers. *Social Science and Medicine* 65(3): 418–430.
- Simonsen DG (2005) Accelerating modernity: Time–space compression in the wake of the aeroplane. *The Journal of Transport History* 26(2): 98–117.
- Society for Human Resource Management (2001) *Benefits Survey*. Available at: <http://www.shrm.org/Research/SurveyFindings/Documents/2001%20Benefits%20Survey.pdf> (accessed 20 August 2012).
- Stearns P, et al. (1996) Children's sleep: Sketching historical change. *Journal of Social History* 30(2): 345–366.
- Terman LM and Hocking A (1913) The sleep of school children: Its distribution according to age and its relation to physical and mental efficiency. *Journal of Educational Psychology* 4(5): 269–282.
- Tiessen M (2006) Speed, desire, and inaction in New Orleans: Like a stick in the spokes. *Space and Culture* 9(1): 35–37.
- Tietze S and Musson G (2002) When 'work' meets 'home': Temporal flexibility as lived experience. *Time & Society* 11(2/3): 315–334.
- Tomlinson J (2007) *The Culture of Speed*. London: Sage Publications.
- Urry J (2009) Speeding up and slowing down. In: Rosa H and Scheurman WE (eds) *High Speed Society: Social Acceleration, Power and Modernity*. University Park: The Pennsylvania State University Press, pp. 179–198.
- Valuch T (2001) A cultural and social history of Hungary 1948–1990. In: Kósa L (ed.) *A Cultural History of Hungary in the Nineteenth and Twentieth Centuries*. Budapest: Corvina-Osiris.
- Vgontzas AN, et al. (2004) Adverse effects of modest sleep restriction on sleepiness, performance, and inflammatory cytokines. *The Journal of Clinical Endocrinology & Metabolism* 89(5): 2119–2126.
- Virilio P (2000) *A Landscape of Events*. Cambridge: MIT Press.
- Wajcman J (2008) Life in the fast lane? Towards a sociology of technology and time. *The British Journal of Sociology* 59(1): 59–77.
- Wajcman J (2010) Further reflections on the sociology of technology and time: A response to Hassan. *The British Journal of Sociology* 61(2): 375–381.
- Webb HW and Agnew WB (1975) Are we chronically sleep deprived? *Bulletin of the Psychonomic Society* 6: 47–48.

- Williams SJ (2005) *Sleep and Society: Sociological Ventures into the (Un)Known*. London: Routledge.
- Williams SJ (2011) *The Politics of Sleep: Governing (Un)consciousness in the Late Modern Age*. New York: Palgrave Macmillan.
- Williams SJ, et al. (2007) Embodying and embedding children's sleep: some sociological comments and observations. *Sociological Research Online* 12(5). Available at <http://www.socresonline.org.uk/12/5/6.html>
- Williams SJ, et al. (2010) The sociology of sleep. In: Cappuccio FP, Miller MA and Lockley SW (eds) *Sleep, Health, and Society*. Oxford: Oxford University Press.
- Zock J-P, et al. (2006) Distribution and determinants of house dust mite allergens in Europe: The European Community Respiratory Health Survey II. *Journal of Allergy and Clinical Immunology* 118(3): 682–690.