

A Researcher's Experience of Wearing a GPS-EM Device

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Abstract

The United States (US) has pioneered the use of Global Positioning System-Electronic Monitoring (GPS-EM) technology within the sphere of community based corrections. Typically a number of conditions are imposed on offenders on GPS-EM sanctions, but the key condition imposed is wearing the GPS-EM device. As there is no research analysing the GPS-EM device's impact on the wearer, the primary author (from here on referred to as 'the researcher'), using autoethnography as a methodology, trialled wearing the GPS-EM device for a 14-day period. The aim was to assess several operational aspects of the device, particularly pertaining to its wearability including physical, psychological and social impacts. The researcher performed ordinary activities while having movements tracked and restricted in accordance with the specified curfew and predetermined inclusion and exclusion zones. The findings indicated that the GPS-EM device was relatively easy to operate and that a number of burdensome physical, psychological and social impacts were associated with wearing it.

The use of and reasoning behind GPS-EM

The United States (US) commenced its application of GPS-EM in 1997, but its use has proliferated since the year 2000 (DeMichele and Payne 2009a:31; Lilly 2006:94). This was due to extensive expansion of existing state and federal sex offender laws as a result of a public outcry after known sex offenders committed brutal crimes on children. The updated sex offender laws are essentially 'memorial laws' as they are named after the victims: Megan's Law (1994), Jessica's Law (2005) and Adam Walsh Law (2006) (Bales et al 2010:1; Harris and Lurigio 2010:477; Terry 2011:2575). Collectively, these laws impose longer incarceration terms and ongoing post-sentence community based surveillance of sex offenders. The surveillance specifically encompasses:

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1. sex offender registration and community notification;
2. residency restrictions; and
3. GPS-EM of serious sex offenders (mostly paedophiles) who have completed their maximum prison sentences.

This article, however, only analyses the third aspect of the ongoing post-sentence community based surveillance of sex offenders — GPS-EM. This is because there is plentiful research on the first and the second aspect, while research on the third aspect is limited (Harris and Lurigio 2010:478–9).

Recently, existing sex offender laws in the US have been further extended so that GPS-EM can be applied to serious sex offenders as a condition of standard probation and parole, allowing complete or partial diversion from imprisonment (Armstrong and Freeman 2011:175; Jannetta 2006:1; Myers 2011:25). Some states have also broadened the types of serious offender categories on whom GPS-EM is applied. So, apart from serious sex offenders they have included: violent offenders; habitual property offenders; gang-related offenders; perpetrators of domestic violence/stalking;¹ and, in some cases, bailed high-risk defendants (Brown, McCabe and Wellford 2007:2–26; Drake 2009:3–5; Jannetta 2006:5; Pinto and Nellis 2011:16; Shute 2007:5). The application of GPS-EM on these ‘other’ offender and even defendant cohorts is still in its infancy, so evaluative and critical discourses, as far as can be determined, are lacking in the available literature. For this reason, the explanatory and evaluative discussion throughout this article will be based on the application of GPS-EM for serious sex offenders.

Throughout the US, GPS-EM can be imposed in duration from a few months to a few years, and even a lifetime in some states (Bishop 2010:1–2; Brown, McCabe and Wellford 2007:2–27; DeMichele and Payne 2009a:31). Non-compliance with GPS-EM typically results in imprisonment. Currently, 35 states in the US are using GPS-EM for serious sex offenders, five are using GPS-EM for broader serious offender categories, and many others are in the process of trialling it (Armstrong and Freeman 2011:175; Tennessee Board of Probation and Parole 2008:6, 27). Overall, about 90,000 offenders are on GPS-EM technology throughout the US at any one time (DeMichele and Payne 2009a:16–17).²

The utilisation of GPS-EM for offenders has been highly contentious in the US. Proponents maintain that it enhances community protection, as the likelihood of offender detection is increased, thereby better protecting the most vulnerable (children) from strangers who want to commit the most repugnant crimes (Jannetta 2006:1; Myers 2011:24; Nellis 2004:15; Sex Offender Supervision and GPS Monitoring Task Force 2010:10–11). These beliefs are held despite plentiful research indicating that the vast majority of paedophiles are known to the victims, and that paedophiles are an offender category least likely to reoffend (Harris and Lurigio 2010:477; Myers 2011:26; Richards 2011:1–2). Further, it is argued that in comparison with prolonged incarceration or a term in a mental health institution, GPS-EM

¹ A specific type of GPS-EM technology called ‘bilateral technology’ is used for perpetrators of domestic violence/stalking where, in addition to the perpetrator, the victim carries their own GPS-EM device and their movement becomes a mobile exclusion zone to the perpetrator’s movements. In a similar way, gang-related offenders are kept apart from each other (Nellis 2010a:9).

² It is worth noting that the use of Radio Frequency-Electronic Monitoring (RF-EM) still outweighs the utilisation of GPS-EM in the US. Over 110,000 offenders are on RF-EM at any one time (DeMichele and Payne 2009a:16–17).

in the community is less onerous for the offender and it provides them with better rehabilitative prospects. It is also much cheaper for the state (Myers 2011:25).

On the other hand, opponents of GPS-EM (mainly the civil rights advocates) argue that GPS-EM conflicts with offenders' human rights, is excessively onerous, and unreasonably adds to the stigma of their conviction (Myers 2011:25). It has also been asserted that it may be unconstitutional to extend correctional supervision after a maximum sentence (as originally set) has been served. To date, however, the judiciary has not ruled any aspects of GPS-EM operation to be unconstitutional (Iqbal 2008:2). Despite the conflicting arguments about the application of GPS-EM, its use has proliferated throughout the US.

Whereas heinous criminal acts against children resulted in the introduction of GPS-EM sanctions in the US, in Australia use of the sanction was sparked by the post-prison release of high-profile child sex offenders. This created 'moral panics' in the media and a community demand for continued strict supervision, including electronic monitoring of these offenders, which already existed in the US (Milovanovic 2005). Legislative changes were subsequently made in three states — Queensland in 2003, Victoria in 2005, and New South Wales in 2006 — allowing serious sex offenders, who pose a high risk of reoffending at the time when they have served the entirety of their original sentences, to be released into the community subjected to electronic monitoring (Bligh and Roberts 2011:1; Robertson 2009:1). Queensland started by supervising serious sex offenders using Radio Frequency-Electronic Monitoring (RF-EM) and is currently transitioning into exclusive use of GPS-EM (Sandy 2011). Victoria has only ever utilised RF-EM, but has announced its intention to switch to GPS-EM in the near future (Price 2010:1–2). On the other hand, New South Wales has only ever used GPS-EM for the monitoring of sex offenders (O'Loan 2011).

In Australia, the legislative changes were made very quickly, leaving little time for a public debate (Szego 2005). The key argument for the change in the law allowing GPS-EM of serious sex offenders after serving their sentences was the improvement of public safety (Bligh and Roberts 2011:1–2). More specific advantages that sporadically appeared in the literature included that being on GPS-EM: deters offenders from further offending; results in controlled offender rehabilitation; and costs less than incarceration (Michael, McNamee and Michael 2006:7). Interestingly enough, at this time there was limited critical discourse in the public arena about this significant amendment to the law. An ethical issue related to GPS-EM mentioned in the literature was the possibility of imposing restrictions on sex offenders who may not in fact be likely to offend again (Michael, McNamee and Michael 2006:7). Further, professionals who treat sex offenders also raised the uncertainty that these legislative changes would in fact reduce reoffending (Szego 2005).

More comprehensive critical debate about GPS-EM occurred when the use of GPS-EM was considered for domestic violence aggressors (Immigrant Women's Speakout Association of NSW 2011; Social Issues Committee 2011). In particular, various stakeholders sent submissions to the NSW inquiry into domestic violence trends and issues. The submissions that referred to the use of GPS-EM generally argued that it would be a useful tool with some shortcomings. Specified shortcomings included that GPS-EM: invades domestic violence aggressors' civil liberty and privacy; devices can be removed; and tracking signals can be lost for a period of time (Immigrant Women's Speakout Association of NSW 2011:3; Social Issues Committee 2011). Immigrant Women's Speakout Association of NSW (2011:3) also warned that the use of GPS-EM will only be successful if detailed regulations and sophisticated practices guide its operation. Therefore, when proposals were made to change the law to use GPS-EM for serious sex offenders, limited concerns were put

forward, but when indications appeared to expand the GPS-EM population, stakeholders presented various critical arguments.

GPS-EM has been in use in the US and Australia, and it is also utilised in Sweden, Spain and Brazil (Comunidad de Madrid 2009; Dawson 2010; Fransson 2005). In addition, it has been trialled in a few countries around the world including England and Wales, New Zealand and Canada. The results of these pilots have generally shown varied success. As a result, some countries are in the process of launching the use of GPS-EM and others continue piloting GPS-EM (Brosnahan 2010; Nellis 2011b).

An explanation of GPS-EM technology

RF-EM technology traditionally used in home detention based sanctions typically provides a yes/no answer to the question 'is the offender at their monitored location (such as their home or workplace) at certain predetermined times?' This static technology cannot provide any information about the offender's movements when they are not at their monitored location (John Howard Society of Alberta 2000:3). GPS-EM technology fills this gap as it is capable of providing an answer to the open question 'where is the offender now and where have they been in the past?'. This is the highest level of community based supervision (just below incarceration in the sentencing continuum), which allows a whole new dimension of monitoring to be applied. These include examining the association of monitored individuals and their behavioural patterns (Bishop 2010:2; DeMichele and Payne 2009a:31; Jannetta 2006:7; Sex Offender Supervision and GPS Monitoring Task Force 2010:10; Shute 2007:10; Wagner 2008:7). Further, forensic analysis of an offender's movement can be used in court to convict or exonerate them and, as such, it serves as a deterrent to criminal behaviour (Sex Offender Supervision and GPS Monitoring Task Force 2010:20; Wagner 2008:7).

GPS-EM, similar to RF-EM, is a complex integrated system with three specific purposes. First, it must provide confidence that the device is on the individual on whom it was installed. Second, it must obtain the individual's location information. Third, it must inform the authorities of any breaches of the stipulated sanction condition/s (Jannetta 2006). The various GPS-EM devices on the market currently have differing methods for achieving the above objectives.

In order for the GPS-EM to obtain the wearer's location it needs to be in a position in which it can receive the GPS signal from the GPS satellites. There are 24 US military defense NAVSTAR GPS satellites constantly orbiting the earth and sending GPS signals to receivers all over the world (Brown, McCabe and Wellford 2007:1-1; DeMichele and Payne 2009a:34). This signal is best received outdoors, but modern GPS-EM receivers are sensitive enough to also receive signals in domestic environments through tiled rooves or large windows. Difficulties in obtaining a location are typically encountered in heavily urbanised areas, in or around high-rise buildings, in tunnels and underground, and in metal enclosures such as trains and, to a lesser extent, in cars (Buck 2009:3; DeMichele and Payne 2009a:36; Shute 2007:13).

The GPS-EM device must be able to access the Global System for Mobile Communications (GSM) network to transfer information regarding its location and any breaches, such as curfew violations or equipment tampers, to the vendor's Central

Monitoring System (CMS) for processing (Brown, McCabe and Wellford 2007:2-11; DeMichele and Payne 2009a:32, 35). Access to the GSM network can be a problem in far rural and mountainous areas, in underground parking garages or rail tunnels (Nellis 2008:5).

GPS-EM technology is constantly being enhanced through improved reception, mobile phone tower triangulation, additional satellite location systems, integration of WiFi and WiMax data into GPS systems and dead reckoning (for further information, see Drake 2009:6-8; Nellis 2010a:3). In particular, a significant expansion of the Global Navigation Satellite System (GNSS) has been forecast for the next five years, when 'more than 100 satellites could be available to users and multi-GNSS tracking will deliver improved availability, accuracy and integrity' (The Victorian Spatial Council 2011:12).

GPS-EM sanctions' conditions and typology of punishment

The most demanding condition of GPS-EM sanctions or GPS as a condition of probation and parole is wearing the GPS-EM device. This is because a number of other conditions are associated with it; these include regular charging of the GPS-EM device, remaining in specified inclusion zones at predetermined times and staying away from predetermined exclusion zones, both of which are monitored by the GPS-EM device. Additional conditions — more specifically, concerning offender rehabilitation and reintegration — are identified to target individual's offending behaviour (Brown, McCabe and Wellford 2007:2-31; Martinovic 2010a). Consequently, GPS-EM sanctions usually subject offenders to some of the following conditions:

- not committing a further offence/s
- wearing the GPS-EM device and various associated conditions including:
 - regularly charging the device and responding to its alerts;
 - not tampering with the device;
 - abiding by curfews monitored by the device;
 - remaining for a specified period of time in inclusion zones, such as the workplace, monitored by the device;
 - staying away from predetermined exclusion zones monitored by the device.
- residing in a 'suitable residence' that has electricity, a landline and/or cell phone, and is not in close proximity of places frequently visited by children (only for sex offenders)
- undertaking polygraph examinations
- receiving phone calls, home and workplace visits, and allowing a search of their premises to check the appearance and operation of the EM equipment, and whether they are in possession of any forbidden substances/weapons
- engaging in employment
- performing community work
- maintaining a log book of daily activities
- attending treatment/counselling sessions
- remaining drug and alcohol free
- prohibition of contact with criminally inclined associates

- prohibition of contact with children (only for sex offenders)
- paying for: part of supervision cost; drug/alcohol testing; and specific victim restitution payments/fines/court costs (only in the US) (Bales et al 2010:150; Brown, McCabe and Wellford 2007:2-26; Tennessee Board of Probation and Parole 2008:13).

Offenders' compliance with all of these conditions is monitored by their supervising officers. Adherence to these multifarious conditions undoubtedly results in offenders on GPS-EM experiencing numerous punitive restrictions and obligations. These can be collectively classified under the 'typology of punishment' that includes four distinct 'components of punishment':

- *Limited and tracked movements* — these are the result of controlled movement and continuous GPS-EM tracking.
- *Facilitating control factors* — these are the result of being subjected to GPS-EM as well as various supervising officer's control mechanisms.
- *Enforced pro-social lifestyle* — these are the result of law-abiding behaviour, generally living a productive lifestyle, as well as numerous rehabilitative and reintegrative measures.
- *Monetary obligations* — these are the result of several mandated monetary contributions.

From this typology it emerges that even though wearing the GPS-EM device is meant to supervise and control the offender and not be punitive, per se, it is inherently associated with all of the components of punishment experienced under the typology of punishment. It is directly associated with facilitating control factors and monetary obligations. Indirectly, it is related with limited and tracked movements and the enforcement of pro-social lifestyle, that are also important as they are likely to lead to rehabilitation and successful reintegration.

Existing evaluative GPS-EM research and a gap in the research

In recent years, an increasing number of jurisdictions outside the US are initiating various sanctions that incorporate GPS-EM, and a growing number of serious offenders are placed on them (Pinto and Nellis 2011:1; Nellis 2010c:11). This is primarily because these sanctions have proven to elicit positive results. Plentiful US-based research indicates that in comparison with being in prison and other non-custodial sanctions, GPS-EM sanctions with specialised treatment provisions reduce offenders' technical violations, absconding and, most importantly, recidivism (Bales et al 2010:148; Brown, McCabe and Wellford 2007:2-31; Losel and Schmucker 2005; New Jersey State Parole Board 2007:4; Padgett, Bales and Blomberg 2006:84).³

Reductions in technical violations and recidivism are reported probably because offenders generally state that wearing the GPS-EM device serves as a continuous reminder that they are on the sanction and that their behaviour is monitored. Hence, it deters them from anti-social behaviour and activities that would elicit non-compliance with the sanction

³ It should be noted therefore that the technology on its own does not foster pro-social behaviour, but positive outcomes occur when it is 'implemented and operated within an overall strategy of behavioural modification' (DeMichele and Payne 2009b:36). See also, Nellis (2011b:158).

(New Jersey State Parole Board 2007:3).⁴ Further, GPS-EM sanctions have been found to enhance the stability in the lives of offenders, creating 'intrinsic motivation' that, in turn, provides them with the ability to complete rehabilitation program/s (Nellis 2011a:4; Nellis 2010c:1; Payne and Gainey 2004:426–31). Cost-effectiveness in comparison with incarceration has also been reported (Bales et al 2010:32; Nellis 2006:105; Padgett et al 2006:84; Wagner 2008:8).

The main limitation that has been associated with the operation of GPS-EM is 'false alerts'. These frequently occur and the monitoring personnel usually find it difficult to ascertain which alerts are false and which ones are real and must be attended to (Armstrong and Freeman 2011:176; Bales et al 2010:137–40, 152; Sex Offender Supervision and GPS Monitoring Task Force 2010:3, 12). The reason behind these alerts is that GPS-EM equipment involves complex technology and devices that are subjected to a variety of harsh environmental conditions on a daily basis. Evidence-based research from the US has indicated that in order for GPS-EM to operate well, an effective centralised monitoring centre is vital for managing the enormous data flow and adequately responding to alerts (Sex Offender Supervision and GPS Monitoring Task Force 2010:12). The staff at the monitoring centre need to be thoroughly trained to interpret and prioritise these plentiful alerts and pass them on to correctional officers and/or the police, who then respond to the alerts (Sex Offender Supervision and GPS Monitoring Task Force 2010:12). There must be a very good collaboration between all of the parties and the monitoring centre must be staffed 24 hours a day (Sex Offender Supervision and GPS Monitoring Task Force 2010:12).

While there are several comprehensive effectiveness-related studies of GPS-EM sanctions measuring recidivism, cost and technological operation, as far as can be determined, there seems to be a gap in research about the punitive impact of these sanctions' conditions on offenders. In particular, there is no specific research analysing the GPS-EM device's impact on the wearer (Nellis 2010b:404; Nellis 2009:42; Tennessee Board of Probation and Parole 2008:36). As Nellis (2009:53) eloquently articulated, 'so little is known about the phenomenology of surveillance, the way experiences of it are configured in consciousness' that any attempt to fill the gap in research is useful. As a result, informing corrections personnel and the wider community about the multifarious impacts that are associated with wearing the GPS-EM device is vital so that they can recognise the onerousness, as well as understand the intricacies, related to wearing the GPS-EM device.

The aim of the trial

To fill the gap in research, the researcher, a specialist on EM sanctions in community based settings (see Martinovic 2010a; Martinovic 2010b; Martinovic 2007; Martinovic 2002), trialled wearing the one-piece GPS-EM device. The specific aim of the trial was to assess several operational aspects of the device, with the focus being on the device's outputs (lights and vibration) and on how far it influences or impedes the researcher's personal routine and ordinary activities. Furthermore, the wearability — including physical, psychological and social impacts — were assessed as a part of this trial. This was done by imposing only the main condition, that is, wearing the GPS-EM device (which inherently includes charging the device daily and complying with the curfew time, inclusion and exclusion zones). It was

⁴ This finding supports earlier research that suggests that being on EM teaches offenders many aspects related to Gottfredson and Hirschi's 'self-control theory' and it reinforces their bonds to society that are related to Hirschi's 'social control theory'. See further, Payne and Gainey (2004:432); Richardson (2002:41).

deemed that this was important as it is a key condition of GPS-EM sanctions with which a number of other conditions are associated, and it is inherently related with all of the components of punishment experienced on these sanctions (Nellis 2009:42). Further, it was considered not practicable to impose the other conditions (such as attending treatment/counselling sessions and payment of supervision cost) that are associated with GPS-EM sanctions on the researcher.

Thus, theoretically, the researcher was only going to experience half of the components of punishment listed in the 'typology of punishment' above. In direct terms, these were facilitating control factors; and, in indirect terms, limited and tracked movements. Accordingly, the impacts could not include enforcement of a pro-social lifestyle and monetary obligations.

The methodology of the trial

Autoethnography as a qualitative method of social research has been used for at least two decades and is increasingly utilised in the area of social science (Ellis 1997; Ellis and Bochner 2003:209, 219; Reed-Danahay 1997:4). It was employed as the most suitable methodology in this trial. Autoethnography is generally defined as a 'personal' or 'self' narrative within a social context (Chang 2008:56; Ellis and Bochner 2003:199; Reed-Danahay 1997:9). Here, the researcher is the object of the research, with the focus being on that specific single case (Chang 2008:49; Foster, McAllister and O'Brien 2006). In addition, information from the private life of the researcher, which influences the outcomes of the research, is disclosed (Ellis and Bochner 2003:217). So, this methodology provides 'engaging truths' about experienced stories.

In 'personal narratives', researchers typically take on dual identities of academic and personal selves to tell autobiographical stories about an experience in their life (Hayano 1979:100; Ellis and Bochner 2003:211). This, however, did not occur in this trial. The reason for this is it is not possible for the researcher to authentically take on an identity of an offender on GPS-EM. Consequently, the methodology employed primarily assessed the wearability of the GPS-EM device from the perspective of the researcher. In addition, personal communication occurred with two investigators from the Home Office in the United Kingdom (UK) who also wore the GPS-EM device. This was done in order to provide an additional perspective and contextual information, thereby reducing this study's subjectivity (Chang 2008:103). The researcher finally 'analysed and interpreted these individual stories within their broader sociocultural context' (Chang 2008:46) by reflecting upon the probable impact of wearing GPS-EM for an offender. Although this last step is not common, it is still within the wider framework of autoethnography (Denzin 1989:27; Ellis and Bochner 2003:211; Pratt 1994:28).

Like any methodological approach, there are limitations associated with autoethnography. It is important to note that any trial by a researcher, including this trial, is a unique experience, essentially a story, which cannot be generalised as 'social facts' (Ellis and Bochner 2003:219; Kempster, Stewart and Parry 2008:3). However, an offender on GPS-EM would equally experience an individual story. This is because, like on the RF-EM sanction, the experience on the GPS-EM sanction is highly dependent on the wearer's personal and social characteristics, such as their gender, age, marital status, and education/employment (Martinovic 2010a:140–2). Hence, in this trial, the wearer's personal

and social characteristics, which undoubtedly had an impact on trial outcomes, included being a 30-year-old well-educated married female without children who works in the Central Business District ('CBD') of a city and resides and spends most free time in the suburbs. Consequently, if someone else with different personal and social characteristics, routine and ordinary activities conducted this trial, it is foreseeable that the operational and wearability outcomes would be different.

Setup and conditions of the trial

The trial took place in Melbourne (Australia) in August 2010 and lasted for 14 consecutive days. The 14-day timeframe was selected as it was considered to be the minimum amount of time required to analyse some of the aspects related to the wearing of the GPS-EM device. In addition, some GPS-EM sanctions last up to one month (Spain, Catalonia) or up to three months (some US states)⁵ (Brown, McCabe and Wellford 2007:2-27; Pinto and Nellis 2011:10).

The trial commenced with the installation of the one-piece GPS-EM device by the co-author on the researcher's (chosen) left ankle. The GPS-EM device used in the trial was an ElmoTech branded ITrack GPS device. The device is similar in size to a computer mouse (Jannetta 2006:6), weighs 180 grams, is made of hypoallergenic materials, is unobtrusively ergonomically designed without sharp edges, and fully waterproof (Brown, McCabe and Wellford 2007:5-4). It is attached using a tamper proof strap, which has a fiber optic strand, and it is designed to alert the authorities of any attempts to remove the GPS-EM device (Jannetta 2006:6). In cases of medical or safety emergency, such as leg swelling, the GPS-EM device's strap can be cut off with scissors. A gap of about 1.5 centimetres was left between the researcher's ankle and the device to increase comfort.

The GPS-EM device throughout the trial communicated with an ElmoTech E3 integrated CMS. The device contains a GSM modem as means of communication to and from the CMS. The GSM carrier chosen for the trial was Telstra, which has the widest GSM coverage in Australia. The GPS-EM device itself contains a GPS receiver as primary means of determining its location. A secondary means of determining its location is the use of cellular carriers Location Based Services (LBS), GSM triangulation service, built-in dead reckoning technology and a static RF-EM capability. Since these advanced functions are not necessarily available in all GPS-EM models, they were turned off to keep the trial as open as possible. The GPS-EM device used in the trial was designed to store any information gathered during periods of GSM inaccessibility and upload this information once GSM network coverage was resumed. Further, to detect any attempted breaches, the GPS-EM was configured to maintain regular contact with the CMS. If the CMS failed to register this regular contact, the CMS would alert the operator that the device had failed to communicate.

After installation of the device, the co-author inducted the researcher (in the same way as is usual with offenders) on how to comply with the requirements of the GPS-EM (Jannetta 2006:6). First, the charging requirements were explained. The GPS-EM device contains a battery, which allows for 24 hours of operation on a two-hour charge. Connecting the GPS-EM device to a power adapter plugged into a wall power outlet charges the battery. The

⁵ It should be noted that that these states typically impose GPS-EM technology in probation/parole conditions (Brown, McCabe and Wellford 2007:2-27).

charger is attached to the device by means of a magnetic coupling. If the wearer moves away from the wall-mounted charger the magnetic coupling instantly undocks (Jannetta 2006:6).

Second, interpretation of the GPS-EM device's alerts (lights and vibration) was explained. The GPS-EM device's wearer interface consists of a vibration alert and three lights, which indicate to the wearer any required action to remain in compliance with the GPS-EM sanction. Whenever the device registers a curfew or zone violation, is running low on battery power, or experiences a loss of GPS, the device vibrates and one of its three lights indicating the specific issue lights up, as follows:

- The power light — if flashing, requires the wearer to charge the device.
- The zone light — if flashing, indicates to the wearer to move away from a prohibited location, be that presence in an exclusion zone or absence from a scheduled inclusion zone.
- The GPS light — if flashing, requires the wearer to obtain a GPS signal.

The vibration lasts a few seconds to alert the wearer to check the lights and to rectify the issue (for example, to charge the device or move away from the exclusion zone). The vibration alert will repeat until the issue is rectified. If the issue is not rectified within the set grace period a violation is reported to the operator.

Similarly to placing an offender on a GPS-EM sanction, the co-author determined and programmed into the GPS-EM inclusion and exclusion zones as well as a curfew (Bishop 2010:2; DeMichele and Payne 2009a:33; Jannetta 2006:6). Inclusion zones covered the researcher's home and the workplace. A primary school, a kinder-garden and a park were setup as exclusion zones. A ten-hour night curfew at home was also imposed. The trial aimed to be as authentic as possible to an offender's experience wearing the GPS-EM device. This specifically involved the researcher behaving in accordance with personal routine and performing ordinary activities while having movement tracked and restricted as per the specified conditions.

While residing in a single-storey house 20 kilometres from Melbourne's CBD, ordinary activities included driving to work to the CBD, going shopping, and daily exercise and socialising on the weekends. Routine movements included daily 20 kilometre drive to work, walking on foot between several university buildings and a 10-kilometre power-walk. The GPS-EM device had to be charged daily and if it indicated a loss of GPS signal there was a requirement to reobtain GPS position as soon as possible. The accuracy of the boundaries of inclusion and exclusion zones was also tested. As per the methodological framework employed (autoethnography), the researcher kept a reflective daily journal documenting the operation and the personal impacts associated with wearing the GPS-EM device (Ellis and Bochner 2003:228).

The results of the trial

The findings indicated that during the trial, unless a test of the operation of the device was performed, there was no alert from the device. This is due to the researcher abiding by the trial conditions, that is, regularly charging the device, adhering to curfew times and inclusion zones, and avoiding exclusion zones. More specifically, the following was observed:

- The GPS-EM device's indication of power charge was accurate. It only lacked power when charging was skipped on one occasion in order to test battery life. On all other occasions it did not lack power due to regular daily charging.
- The GPS-EM device's indication of zone violation was almost always accurate. The boundaries of inclusion and exclusion zones were tested regularly. For example, on the way to work driving past the brink of an exclusion zone (also called the 'warning zone'), the device daily vibrated at almost the same spot. However, occasionally while in the home (an inclusion zone), a zone violation appeared. This was due to inaccurate indoor GPS-EM location reading, which readjusted itself usually within one minute without any input from the researcher. Analysing the logs post-trial showed that a minor adjustment to the zone boundaries would have resolved the issue.
- The GPS-EM device indicated loss of GPS signal on several occasions at work in the CBD. This finding is in line with other research and points toward commonly experienced difficulties with GPS when surrounded by a number of high-rise buildings (DeMichele and Payne 2009a:36; Shute 2007:13). It required periodically going out and standing away from these buildings for a short time to reobtain the GPS signal. During the trial LBS, which provides positioning indoors, was turned off.

The researcher had to plan all movements in advance to remain in compliance with the stipulated trial conditions. The precision of the GPS-EM technology required the researcher to schedule all activities and keep exact time management.

Apart from the operational aspects, the physical, psychological and social impacts associated with wearing the device were also assessed. In terms of the physical impact, wearing the almost 200 gram GPS-EM device on the ankle generally felt cumbersome. This was particularly noticeable during prolonged standing at work and when walking as a part of an exercise routine. Comfort levels were increased by adjusting clothing, such as wearing a sock between the ankle and the device. Using flat comfortable shoes or runners offered more comfort than wearing high heels. Boots were impossible to wear due to being too narrow to accommodate the ankle with the GPS-EM device.

The device also felt somewhat burdensome while sleeping when 'turning to the other side' of the bed. This was due to waking up and feeling the device on the ankle and, subsequently, not always being able to fall asleep immediately. It is important to mention, however, that the researcher experienced no health issues such as an allergic reaction, chafing or bruising as a result of wearing the GPS-EM device. Similarly, no heat or coldness was ever felt on the ankle during the trial, including when the device was charged.

The most significant psychological impact was the awareness that the GPS-EM device was 'on the body'. The only times the presence of the device was completely forgotten was while sitting down and concentrating on work or enjoying entertainment. The awareness served as a useful reminder that the researcher was on a trial and needs to comply with the various trial conditions. Although the researcher was aware that all of her movements were tracked, the researcher did not experience the 'feeling of constantly being watched' by the authorities. This is probably because this was a trial and not a 'real' sanction.

An annoyance arose on occasions when the device vibrated due to the loss of GPS signal while the researcher was at work and work commitments prevented her from immediately going outside to reobtain the signal. Similarly, occasionally an inaccurate GPS reading caused the device to vibrate, waking the researcher up during the night. This resolved itself within one minute, but it did leave the researcher confused and finding it difficult to fall

asleep immediately. It is also worth noting that sitting next to a power plug to charge the device for two hours a day was initially frustrating, but as the time progressed interesting and useful activities were planned for these periods. In fact, burdensome physical and psychological impacts were most obvious during the first days of the trial and somewhat lessened as the trial progressed.

Contrary to the physical and psychological effects tangibly experienced, wearing the GPS-EM device had less impact on the researcher's social interactions. In particular, in work-related settings the researcher happily entered discussions about the wearing of the device with colleagues and students in the university. This was enjoyable because these parties were genuinely interested in the operation of the GPS-EM technology and the aim of the trial. Similarly, in personal settings discussions with family and friends were very positive and most importantly they provided a sense of encouragement to complete the trial. On the other hand, discussing the trial with some acquaintances who strongly support punitive treatment of offenders and do not understand the basic reason behind the trial led to a personal feeling of frustration and, subsequently, reduced social interaction with those acquaintances. Furthermore, discussions with strangers in public settings were avoided as embarrassment was felt in an instance when the GPS-EM device was worn in a visible way and some passersby started at it, asked questions and were sceptical that it was a part of a trial. The concealment of the GPS-EM device was easy to achieve by wearing loose trousers so strangers could not see it to ask questions about it.

An important realisation was that the GPS-EM device did not negatively impact on the researcher's co-resident, who is a spouse. The GPS-EM device's vibration alert is apparent only to the wearer and does not make any noise. Further, the GPS-EM device does not involve the utilisation of a landline phone and so there was no disruptive ringing that is associated with some earlier models of EM technology (Ansary 1999:204; Church and Dunstan 1997:57; Nellis 2009:48; Richardson 2002:42).

Two investigators' experiences of wearing the GPS-EM device

Consistent with autoethnography — the methodological framework employed in this study — and due to a distinct lack of research about the GPS-EM device's impact on the wearer, personal communication over the phone occurred with two investigators from the Home Office in the UK who had also worn the GPS-EM device. Their journal notes were discussed and compared with this researcher's to enable better articulation of the experience of wearing the GPS-EM device (Martinovic 2011a; Martinovic 2011b). Birkett wore the GPS-EM device on a few occasions for periods of up to a week between 2004 and 2006. Ebling wore the GPS-EM device more recently, in 2010, for a period of two weeks. Both Birkett and Ebling's aim in wearing the devices was to check the accuracy of GPS-EM; so they tested the operational capabilities of the devices and deliberately violated the predetermined inclusion and exclusion zones (Martinovic 2011a; Martinovic 2011b). Operationally, both Birkett and Ebling, like the researcher, found operating the GPS-EM device to be relatively easy.

When asked about the wearability of the GPS-EM device, both Birkett and Ebling generally described somewhat less punitive impacts to the ones reported by the researcher above. However, they agreed that the punitive impacts generally eased as the time wearing the device progressed. In terms of the physical impact, both Birkett and Ebling felt that

wearing the GPS-EM device was somewhat 'inconvenient' (particularly, during battery charging), but not 'cumbersome' as this researcher perceived it to be (Martinovic 2011a; Martinovic 2011b). This can be explained by the fact that both Birkett and Ebling wore GPS-EM devices that were comparatively smaller than the one worn by the researcher.⁶ Further, both Birkett and Ebling are males. Research has shown that males generally report the EM sanction experience to be less onerous than do females (Ansary and Benveneste 1999:130–2; Micucci and Maidment 1997:10; Nellis 2009:49).

Birkett and Ebling's wearing of GPS-EM devices resulted in very similar psychological and social impacts to the ones experienced by this researcher. In terms of the psychological impact, unlike this researcher, who generally 'felt the device on the body', Birkett and Ebling reported that they sometimes 'felt the device on the body'. They specifically considered charging the battery to be the most intrusive. Like this researcher, neither Birkett nor Ebling felt that they were 'watched' by the authorities. This is explained by the fact that they themselves monitored their own movements on the GPS-EM computer system. They also felt that they could easily conceal the GPS-EM device so that it was not noticeable by other people. Like the researcher, inaccurate GPS-EM location reading was experienced on a few occasions by both Birkett and Ebling, which they reported to be annoying (Martinovic 2011a; Martinovic 2011b). In addition, no negative social impact was felt by Birkett, Ebling or this researcher. In work-related settings Birkett and Ebling reported that they enjoyed discussing the wearing of the GPS-EM device as their colleagues generally found their trials interesting. In personal settings they felt that their socialisation was unaffected (Martinovic 2011a; Martinovic 2011b).

Researcher/investigator versus offender wearing the GPS-EM device

In accordance with autoethnography, the researcher finally reflected upon the probable impact of wearing GPS-EM for an offender. As this was done on the basis of comparing the impact of wearability of GPS-EM on the researcher/investigator versus an offender, the findings indicated some similarities, but many differences in the actual impact. In terms of operating the GPS-EM device Birkett, Ebling and this researcher, found it to be relatively easy, but this may not be the case with an offender who is illiterate and lacks the ability to carefully plan ahead their movements.

The most similar impact would be the physical impact. This is because physically, the device probably feels the same regardless of whether the researcher/investigator or an offender is wearing it. In particular, it is likely to feel cumbersome on the ankle, especially during prolonged standing, and burdensome while sleeping when 'turning to the other side' of the bed.

The psychological impact on a researcher/investigator versus an offender probably has a few similarities and many differences. Similarities include 'feeling the device on the body', and an awareness of the need to diligently charge it and respond to its alerts. However, if an offender has no access to an electrical outlet to charge the device due to being homeless or indigent, as is the case for many offenders in the US, finding a place to charge the device can

⁶ More specifically, Birkett wore a two-piece GPS-EM device whose ankle component is 3–4 times smaller and lighter than the one-piece GPS-EM device worn by this researcher. Similarly, Ebling wore a slightly smaller GPS-EM device than the one worn by this researcher.

be a real burden (Myers 2011:24, 26; Tennessee Board of Probation and Parole 2008:37).⁷ A related problem for offenders on GPS-EM more generally is that they usually find it difficult to find and/or keep employment due to well-reported employers' reluctance to employ offenders on GPS-EM sanctions (Tennessee Board of Probation and Parole 2008:36). Similarly, if an offender is homeless or indigent, sitting next to a power plug to charge the device for two hours a day is likely to feel boring and even frustrating. This is because they are likely to lack the ability to afford some entertainment that could make the charging time go faster.

The key difference in relation to the psychological impact, however, is that the researcher/investigator is not legally compelled to comply with GPS-EM sanction conditions. The offender, on the other hand, is under a strictly imposed court or parole board ordered sanction, which has plentiful restrictions including GPS-EM, and the alternative to non-compliance is incarceration. As a result of this, unlike the researcher/investigator, an offender is much more likely to experience the 'feeling of constantly being watched' by the authorities as correctional personnel can, at any time, inquire about their whereabouts for which they must have a satisfactory explanation. More generally, also unlike the researcher/investigator, an offender is likely to feel psychological pressure as they are unlikely to have an already established structured pro-social lifestyle. More specifically, an offender is likely to be experiencing various personal problems, such as battling addiction/s and/or psychological problems, as well as, trying to reintegrate back into the society and rebuild broken family and community connections.

The social impact of wearing the GPS-EM device probably varies most of all the impacts between the researcher/investigator and an offender. Unlike the researcher/investigator who typically only hides the wearing of the GPS-EM device to strangers, an offender is likely to hide the fact that they are wearing the GPS-EM device in all of their work-related, as well as personal interactions. The hiding of the GPS-EM device is likely to result in an offender generally feeling very uneasy about intermingling with people (Bales et al 2010:101).

Consequently, the overall experience of wearing the GPS-EM device is probably more onerous for offenders than researchers/investigators. This is because the researcher/investigator has chosen to wear the GPS-EM device for only one/two weeks, whereas an offender may be ordered to wear it for a longer period, typically over six months and even more so over a year, so the overall impact would be considerably more onerous. Further, once the other conditions associated with GPS-EM sanction are imposed (apart from wearing the GPS-EM device and its associated conditions), offenders are likely to feel plentiful punitive impacts as a result of being on the GPS-EM sanction. As this research is non-existent, it is recommended that a study be undertaken interviewing offenders with different personal and social characteristics about the impact of being on the GPS-EM sanction — that is, wearing the GPS-EM device as well as abiding to the other conditions that are imposed on them.

⁷ Homelessness is an unfortunate outcome for many sex offenders on GPS-EM in the US due to strict residency restrictions (Myers 2011:24–6). However, in 2010 Massachusetts' highest court ruled that offenders should not be punished if they have no access to a power outlet to charge the GPS-EM device (Myers 2011:24). In such cases, the Department of Corrections is responsible for organising alternative arrangements, such as charging of the GPS-EM device at their premises (Myers 2011:24).

Wider application of the findings

Some lessons learnt from this researcher's trial of wearing the GPS-EM device can have wider application. This is in accordance with the methodological framework (autoethnography) that was employed in this study (Ellis and Bochner 2003). The findings that the wearer has to meticulously plan ahead their movement in relation to time and place, and that wearing of the GPS-EM device has various punitive aspects, need to form a significant part of supervising officers' case management. Supervising officers should also discuss some more specific study findings with offenders on GPS-EM sanctions — these include:

- as time progresses, punitive physical and psychological impacts that are associated with wearing of the GPS-EM device somewhat lessen;
- some simple strategies can reduce the burdensome impacts that are associated with wearing the GPS-EM device;
- the wearing of the device can serve as a reminder to the wearer to comply with GPS-EM sanction conditions;
- positive encouragement and understanding by family and friends is important to comply with and complete the GPS-EM sanction.

This more 'informed' case management based on an understanding of the multifarious impacts that are associated with wearing the GPS-EM device should result in GPS-EM sanction experience being more manageable for offenders.

Conclusion

Significant advances towards the development of GPS-EM technologies that enabled increasingly precise offender tracking systems in near real-time have contributed to the placement of most dangerous offenders onto these sanctions (Armstrong and Freeman 2011:175; DeMichele and Payne 2009a:31; Lilly 2006:94; Nellis 2005:136; Tennessee Board of Probation and Parole 2008:27). The introduction of GPS-EM sanctions has, however, resulted in some successes and controversies, and these sanctions have continued to have their proponents as well as opponents. Despite the ongoing debate, the fascination with increased offender surveillance has flourished, and the use of GPS-EM has continued to proliferate (Bishop 2010:6; DeMichele and Payne 2009a:17; Nellis 2004:9).

This researcher found the operation of the GPS-EM device to be generally accurate and user-friendly during the trial. The researcher, however, had to carefully plan ahead all of her movements in relation to time and place. Further, a number of punitive effects were experienced due to wearing the GPS-EM device. In particular, a number of burdensome physical and psychological impacts were associated with the wearing of the device. However, when some simple strategies to avoid and/or reduce these impacts were deployed and as the time progressed, the psychological and, particularly, the physical impacts associated with it somewhat lessened. In comparison with these impacts, the social aspects were less impacted during the trial. A personal communication with two investigators from the Home Office in the UK, who had also trialled the GPS-EM device, revealed very similar findings. It should be mentioned that the impact of wearing the GPS-EM device on an offender as opposed to a researcher/investigator would probably be more onerous.

This would particularly be the case if myriad additional conditions associated with the GPS-EM sanction were imposed.

In line with the current trend, and in the foreseeable future, GPS-EM devices will become further miniaturised, lighter and less obtrusive to the wearer (Brown, McCabe and Wellford 2007:4-1; Nellis 2005:132; Shute 2007:15; Wagner 2008:4). Consequently, in an era of severe budget cuts where alternatives to imprisonment are generally viewed positively (Myers 2011:24), GPS-EM 'may be as fateful and significant for the twenty-first century as probation was for the twentieth century' (Nellis 2004:15).

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