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Intimate Surveillance: Normalizing Parental Monitoring and Mediation of Infants Online

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Tama Leaver

Abstract

Parents are increasingly sharing information about infants online in various forms and capacities. To more meaningfully understand the way parents decide what to share about young people and the way those decisions are being shaped, this article focuses on two overlapping areas: parental monitoring of babies and infants through the example of wearable technologies and parental mediation through the example of the public sharing practices of celebrity and influencer parents. The article begins by contextualizing these parental practices within the literature on surveillance, with particular attention to online surveillance and the increasing importance of affect. It then gives a brief overview of work on pregnancy mediation, monitoring on social media, and via pregnancy apps, which is the obvious precursor to examining parental sharing and monitoring practices regarding babies and infants. The examples of parental monitoring and parental mediation will then build on the idea of "intimate surveillance" which entails close and seemingly invasive monitoring by parents. Parental monitoring and mediation contribute to the normalization of intimate surveillance to the extent that surveillance is (re)situated as a necessary culture of care. The choice to not survey infants is thus positioned, worryingly, as a failure of parenting.

Keywords

surveillance, infancy, childhood, datafication, wearables

Introduction

In August 2014, in a parody, or more accurately, an homage, a former Apple employee created a compelling online birth announcement in the style of online Apple product information. He created a website that announced "Hello, baby. Introducing Jonathan, the brand new mini" (Kleinke, 2014). The web page was styled like an Apple product, including iPad Mini screens featuring the newborn's photographs with clever and playful text:

> The brand new Jonathan (Mid-2014) features a 20-inch seamless unibody enclosure made from a single, solid block of beauty. Ten meticulously aligned fingers deliver the perfect multi-touch experience. Plus, he comes fully equipped with not just one but two iSight cameras, each delivering images in stunning Retina resolution.

Icons showed built-in apps including the iEat and iPoop, notifications included "parental sleep mode disabled by default," and a calendar app displayed the exact date of Jonathan's birth. After gaining considerable online attention, Jonathan's father, Andreas Kleinke, was interviewed by a range of media outlets about his novel and endearing announcement (Pawlowski, 2014; Thomas, 2014). Kleinke's announcement is indicative of an era where parenting takes place in a world of networked online communication. The iBaby announcement was seen across the globe and was liked, shared, and retweeted across social media. In doing so, thousands of people joined Jonathan's parents in celebrating his birth. It is also the case, however, that this playful announcement placed Jonathan's full name, his date of birth, his father's name, the town where he was born, and a host of other information online. This information is likely to persist in some fashion, even if his original birth announcement is one day taken offline. Jonathan's parents may well have made an educated choice that having this information online

Curtin University, Australia

Corresponding Author:
Tama Leaver, Curtin University, GPO Box U1987, Perth, WA 6845, Australia.
Email: T.Leaver@curtin.edu.au

was acceptable to them. Yet as Jonathan establishes his own life and online presence, his date of birth and other information will always be publicly accessible. As such, this personal information will be available to anyone, anywhere, even if it might routinely be requested by platforms, banks, and corporations to confirm his identity, passwords, or security in later life. As such, the iBaby announcement is an online artifact that is infused with affective familiarity but simultaneously provokes important questions about parents, children, networked communication, and persistent online identities.

As Sonia Livingstone (2009) has argued, public perceptions of children's Internet use have all too often been framed through the lens of media-fueled moral panics, as well as the prevailing myth of the digital native. However, just like the convenient but often opaque shorthand "Web 2.0" (Allen, 2013), research has largely disproven the notion that younger people have an intrinsically deeper and more literate understanding of online technologies simply by virtue of when they were born (Bayne & Ross, 2011; Bennett, Maton, & Kervin, 2008; Jones, Ramanau, Cross, & Healing, 2010; Selwyn, 2009). The persistence of the digital native myth, especially in the mainstream media, can create and perpetuate expectations of a divide in skills between young people and their parents in terms of online tools and mobile devices. That said, more recent research has found that as children's use of networked communication technologies and online affordances increases, young people, often in meaningful dialogue with their parents, learn to negotiate their own privacy and presence, often in quite complex and nuanced ways (Clark, 2013; Livingstone & Sefton-Green, 2016). Moreover, as young people establish their own identities online—sometimes using platforms and accounts for a short period of time, and sometimes establishing accounts that will persist far longer—they are often very mindful of their multiple contexts and need for privacy, although that initial sense of privacy may be in terms of limiting what they share with parents and family rather than the data shared with online platforms (boyd, 2014). Notably, younger children's Internet use has been growing over the last decade, with different levels of access, and even toddlers are increasingly utilizing apps on mobile, connected devices (Holloway, Green, & Livingstone, 2013; Holloway, Green, & Love, 2014).

This article, however, focuses on babies and infants who have no direct self-representational agency, and whose online presence (if any) is crafted by other people, especially their parents, guardians, and loved ones. Research on identity and social media focused on individuals who do *not* have agency in their representation, such as infants, can provoke new questions about parenthood in the era of networked communication as well as about the operation of social media and a host of new technologies capturing data about very young people (Leaver, 2015b). The shift in recent years toward online identities that are tied to real names and can persist indefinitely (van Dijck, 2013b; van Zoonen, 2013) makes that research urgent in that the implications of parental choices today may have very long-term implications for their children. Indeed, the question of what parents share about their children online is, itself, now being discussed in provocative terms. In an online resource asking "Are you a 'sharent'?", the Child Exploitation and Online Protection (CEOP) Centre (2015) in the United Kingdom warns that parents posting photographs and other media about their children are creating "their digital tattoo," with the foreboding warning that "every publically accessible image or comment featuring your child contributes to a public image which will follow them into the future." The notion of sharenting, or oversharenting, is clearly wrapped up with both present and future considerations of privacy. For all social media output, privacy considerations depend greatly on the context in which that media are read or viewed (Nissenbaum, 2009). It follows that the potential longevity of photographs, videos, and other media posted containing, and pertaining to, young people, amplifies the number of potential contexts across the lifetime of the young person in question. The resulting context collapse (Marwick & boyd, 2011), or context collision (Davis & Jurgenson, 2014), presents a level of uncertainty and potential challenges that young people and their parents must learn to navigate together.

In order to more meaningfully understand the way parents decide what to share about young people, and the way those decisions are being shaped, this article focuses on two overlapping areas: *parental monitoring* of babies and infants through the example of wearable technologies and *parental mediation* through the example of the public sharing practices of celebrity and influencer parents. The article begins by contextualizing these parental practices within the literature on surveillance, with particular attention to online surveillance and the increasing importance of affect. I then give a brief overview of work on pregnancy mediation, monitoring on social media, and via pregnancy apps, which is the obvious precursor to examining parental sharing and monitoring practices regarding babies and infants. The examples of parental monitoring and parental mediation will then build on the idea of "intimate surveillance" which, as I have argued previously, entails close and seemingly invasive monitoring by parents (Leaver, 2015a). Parental monitoring and mediation, I will argue, contribute to the normalization of intimate surveillance to the extent that surveillance is situated as a necessary culture of care. The choice to not survey infants is thus positioned, worryingly, as a failure of parenting.

Surveillance, Datafication, and Affect

Whitaker (2000) argues that in the information age, we all are part of a "participatory Panopticon" in which we choose to engage and allow many forms of surveillance because the benefits are obvious and clear, but the cost of participation is often hidden. This contrast is even clearer in contemporary digital communication where the immediacy and community

of social media, the convenience of electronic commerce, and the safety afforded by both physical and digital surveillance often mask the price for this participation which include digital trails and profiles that can be owned, analyzed, and manipulated by corporate entities, through to more abstract profiling and modeling that transforms every digital interaction into a small part of a much larger "big data" picture of individuals, groups, and societies. Moreover, these profiles are only visible and exploitable to those aggregating the data behind the screen. While the creation and aggregation of data as an amalgam of the surveyed subject has long been part of surveillance practices, the sheer magnitude of surveillance today, both online and offline, has squarely situated surveillance in the realm of big data analytics (Lyon, 2001, 2014). As Lyon (2014, p. 11) notes, the revelations of widespread government-level data surveillance by whistleblower Edward Snowden "have done good service in showing how far state-based surveillance extends but also how much it depends on Big Data practices that implicate corporate bodies and connect directly with everyday practices of ordinary internet and cellphone users." While surveillance may not be monolithic and inescapable, it is clearly woven into almost every element of an online and digital society.

As José van Dijck (2014) has noted, contemporary surveillance practices are predicated on a prevailing *datafication* taking place wherein all social activity is being tracked and digitized, becoming much sought after big data. Necessarily linked to datafication is the dominance of

> dataveillance—the monitoring of citizens on the basis of their online data—[which] differs from surveillance on at least one important account: whereas surveillance presumes monitoring for specific purposes, dataveillance entails the continuous tracking of (meta)data for unstated preset purposes. (van Dijck, 2014, p. 205)

Earlier surveillance scholarship characterized dataveillance as a subset of physical surveillance, built on more specific and focused targets (Clarke, 1988). However, the breadth of current surveillance ambitions, such as identifying potential terrorist communication among all personal electronic communication, is so wide that it can be used to justify capturing almost any personal information, communication, or media. Dataveillance is thus about the ongoing capture of data which can be later scrutinized as the tools and approaches for analysis often mature after big data are collected, rather than specifically justifying the capture in the first place.

Datafication and dataveillance also underpin the massive expansion of digital health platforms, apps, wearables, and related devices which, in addition, are driven by commodification, or the need to extract value and a meaningful business model from the big data collected (van Dijck & Poell, 2016). Typical health apps and platforms often involve two types of commodities: first, the app, monitor, wearable, or device which is sold initially to individual customers, and, second, insights and analytics produced from the aggregated and analyzed data generated by the customers using these devices. While questions of ownership of data are often very unclear, it is nevertheless the case that most health apps and platforms are for-profit companies and their larger long-term commodity is the aggregated big data and related insights, not the individual-level consumer products and apps (van Dijck & Poell, 2016).

Another recent shift has been toward what Andrejevic (2007, p. 223) calls "lateral surveillance, or peer-to-peer monitoring" which involves different forms of people surveying each other, from potential romantic partners searching for each other's backgrounds online to family and friends monitoring each other, often utilizing technologies both mechanical, such as hidden cameras, and digital, including spyware and keystroke monitors. More to the point, peer surveillance has gone from being highly unusual to an accepted part of life in a digital culture. Andrejevic (2007) argues further that

> we are becoming habituated to a culture in which we are all expected to monitor one another—to deploy surveillance tactics facilitated at least in part by interactive media technologies—in order to protect ourselves and our loved ones and to maximise our chances for social and economic success. (p. 239)

Surveillance of one another is wrapped up with our social, economic, and domestic well-being.

In the context of peer and lateral surveillance, it is unsurprising that people experiencing pregnancy and new to parenthood are more and more drawn into a form of intimate surveillance as part of the way they actively care for their offspring. Intimate surveillance is defined as

> the purposeful and routinely well-intentioned surveillance of young people by parents, guardians, friends, and so forth. The surveyed have little or no agency to resist. On one level, intimate surveillance points to the limits of most surveillance models, in that they are incomplete in trying to address subjects who have no agency or awareness of the means of resistance (for obvious reasons). (Leaver, 2015a, p. 153)

This article builds on the emergence of intimate surveillance and extends the concept, arguing that these monitoring practices are being normalized in contemporary networked cultures. Following from Michel Foucault's (1979, 1990) work, intimate surveillance is not applied or actioned through changes in the law, or other direct force, but becomes normalized through the often invisible disciplinary power of changes to accepted social and cultural practices. In selling and situating monitoring apps, infant wearables, and a host of other items and practices, the fetishization of monitoring and datafication are driven by affect far more so than just information and are thus a key element of the process of normalization.

The centrality of affect—the emotions, feelings, and sentiments present in situations and narratives—has become increasingly clear in recent studies of individuals and groups whose interactions have meaningful online dimensions.

Affect is an important amplifier that can bring communities together and drive political change (Papacharissi, 2014). While affect enables, amplifies, and drives change, it is not inherently positive or negative, but can be either and anywhere in between. Indeed, Donald Trump's 2016 presidential campaign offers an example of affective campaigning, with highly charged emotional messages strategically overwhelming more factual or policy-based discussion. In *Infoglut*, Mark Andrejevic (2013, p. 139) warns of "communication in a post-referential era" in which the sheer amount of (conflicting) information available in networked communication leads to the heightening of affective impact, often overwhelming any connection with reliable meaning. In effect, emotional impact is more effective than the relationship with more recognizable forms of knowledge. Along similar lines, Jodi Dean (2010, pp. 3-4) has argued that affect is a core driver for what she describes as "communicative capitalism" in which "contemporary communications media capture their users in intensive and extensive networks of enjoyment, production, and surveillance." Affective networks in which sentiment and emotion supersede other drivers seduce users into investing in utilizing, valuing, and sharing tools which encourage continual re-use for maximum reward. One example is online social networks wherein the value of the network comes from continued sharing and engagement. The design, operation, and continual changing of Facebook's algorithms, for example, are attempting to continually produce affective encounters, where the sentiment or mood is heightened to encourage further interaction and engagement (Bucher, 2017). For Dean, the underlying exchange taking place, wherein the companies behind these platforms and apps derive value from the data generated through use of their platform, is deliberately obscured by the affective dimensions users enjoy.

In the sections below, I will argue that the combination of datafication, the centrality of affect, and intimate surveillance are normalizing the idea that digital surveillance of infants equates with care and good parenting. To situate that argument, I will briefly review the existing work which has looked at surveillance of the unborn, especially in terms of the explosion of pregnancy-related apps. Then I will focus on infancy using the examples of *parental monitoring* via infant wearables and *parental mediation* as made visible by the social media presence of micro-celebrity or influencer parents who discuss and share media about their children in very visible public forums.

Pregnancy to Infancy

Both the Google Play Store and iTunes Store feature hundreds of pregnancy-related apps, including a wide range of monitoring and tracking applications, some of which are interactive, share data, and some which directly connect to discussion forums and related spaces for conversation and sharing. While there are a wide range of different types of pregnancy apps, there are also some significant commonalities. As Lupton and Thomas (2015) argue, for example, a "dominant feature of pregnancy-related apps is the representation of the fetus as already a communicative person in its own right," and in some apps which add gamified elements, this can involve virtual, but no less emotional, interactions with the unborn. Pregnancy apps, of course, are the most recent in a long line of technologies which visualize the unborn. As Lupton (2013, p. 35) notes, ultrasound technology and sonograms "have been a major contributor to the inexorable trend towards the individualising and infantilising of the unborn," but it is also the case that this trend is magnified greatly in the era of networked sociality. Indeed, on popular social media apps such as Instagram, sharing pregnancy images publicly has become commonplace and can often reinforce a particularly narrow and normative notion of pregnancy and related practices (Tiidenberg & Baym, 2017). A study tracking the hashtag #ultrasound across 3 months in 2014 found that more than 11,000 media items were posted publicly on Instagram, and of the sonograms, more than 34% displayed personally identifiable information, such as the metadata shown on the screen during the ultrasound scans (Leaver & Highfield, 2016). Pregnancy apps and the sharing of pregnancy-related material on social media are thus elements of a much wider social sharing of prenatal information and media online.

Sophia Johnson has argued that pregnancy apps are part of a wider "'device-ification' of mothering," which aligns with the processes of datafication, rendering pregnancy as "an administrative and calculable activity, valuing data over subjective experiences and changing the meaning of what it is to mother and be a mother" (Johnson, 2014, p. 346). Indeed, Johnson (2014) argues further that the visible use of apps, devices, and other tools which can be shared via social media can be situated as part of the "responsibilisation" of motherhood, in which access to greater information and data about pregnancy and the unborn simultaneously increases the expectation of specific ways of acting and self-policing the process of pregnancy and birth. This process is reinforced by the expectation of sharing information about prenatal experiences. As ultrasound photographs, baby showers, pregnancy selfies, and a host of other material are now routinely shared on social media, this either purposefully or inadvertently involves opinions and advice from a wider range of people, who directly or indirectly contribute to the "co-construction of prenatal life" (Seko & Tiidenberg, 2016, p. 57). Indeed, it is not just visual material, but often the outputs of various pregnancy apps which are routinely shared on social media. Designing these apps not just to record significant amounts of data but also to share this on social networks and elsewhere positions these tools as part of the "platformization of the web" (Helmond, 2015) wherein data flows are being shaped for the benefit of existing platforms as much as for individual users. What is clear is that pregnancy apps are part of a wider normalization of the sharing of prenatal images, media, stories, and data, across a range of bespoke and general social media platforms.

However, while the popularity of these apps is increasing seemingly exponentially, a recent study of popular pregnancy apps flagged a number of serious concerns about both the information provided by them and the treatment of the personal data they record (Bert, Passi, Scaioli, Gualano, & Siliquini, 2016). A detailed focus on the eight most popular pregnancy apps found data entered into the apps are shared with third-party companies for marketing purposes (with only a couple including a process to opt-out of this data sharing). Moreover, only three of the eight apps reviewed in detail included any mention of a scientific or medical board informing the information provided using the app. The study concluded that the information provided by pregnancy apps and the sources of this information need to be far more transparent, and the way data generated by users of the app are utilized also needs to be made much clearer. Along similar lines, a survey of 410 Australian women found that 73% had used a pregnancy app and of that group 92% found the apps helpful, 70% used the apps to monitor their fetus' development, but only 21% of the group had checked where at least one of the apps they used had sourced its information (Lupton & Pedersen, 2016). In both these cases, the veracity of information provided by the apps and the use of information generated and recorded by users were unclear.

Beyond privacy issues relating to terms of use, the speed and culture in which pregnancy apps are built can also be problematic. In mid-2016, research revealed that the Glow pregnancy app had a number of very significant privacy issues and vulnerabilities that meant basic information could easily be accessed by third parties, including passwords. Excessive and unclear amounts of personal data were shared in related community forums, and "partner" sharing gave widespread access to the first person to request it, regardless of whether this access was authorized by the app's user or not (Beilinson, 2016). The security issues were sufficient that it gained considerable media and online attention (e.g. Doctorow, 2016); these issues have subsequently been fixed, but the privacy issues with the Glow app are indicative of online startup culture in which the collecting, sharing, and owning of personal data are often prioritized over protecting and securing it, or necessarily providing sufficient privacy for users. Intimate surveillance thus begins with the maternal body. Pregnant women are both watched and viewed through, in order to monitor the unborn, and apps facilitating this monitoring often raise significant privacy issues as well as inherent questions about the veracity of the information they provide. With this context in mind, important questions thus frame any apps and devices pitched at parents of infants.

Parental Monitoring

In 2016, Google was awarded a patent for a "Crib with Embedded Smart Sensors" (Veron, 2016), which includes a multitude of sensors, cameras, and even elements that are responsive to either an infant inside or a parent's outside, connected device. While clearly still in development, Google's interest in the world of infancy and smart sensors serves as a salient indicator that technology companies are increasingly looking at infancy and early childhood as growth areas for products and the associated generation of significant data about individuals in terms of health, sleep, activity, and so forth. Another clear indicator of the increase in online surveillance of infancy is the growth of Internet-enabled, responsive toys. In critiquing what they dub the "Internet of Toys," Holloway and Green (2016) warn that toys that utilize Internet connections to provide personalized feedback and interaction often collate a significant amount of information about the child or children playing with that toy. That information is governed by often unclear Terms of Use which frequently state that the collected information can be utilized for any number of purposes after it is gathered. With that context in mind, this section focuses on one further rapidly growing area: infant wearables.

Infant wearables are monitoring devices which are worn on an infant's body to quantify specific biological activities and states which are then wirelessly transmitted as data to central server. One of the most prominent infant wearables, primarily in the US market, is the Owlet which parents are encouraged to purchase and use from birth. Originally marketed as an "anklet" (Leaver, 2015a), the Owlet is now packaged as a "smart sock" for infants which contains health sensors that relay data via Bluetooth to a base station which in turn transmits this biometric information to the Owlet cloud servers that are accessed via apps on Apple or Android devices. Parents are encouraged to have infants wear the smart sock while sleeping and monitor the biometric information on their phones. On their website, the company promotes three key benefits of the Owlet:

> **Proactively Monitors** your baby's heart rate and oxygen levels so you can have peace of mind. **Sleep Better** with the 83% of parents who report better sleep while using the Owlet Baby Monitor. **Technology Proven** by over 100,000 hours of testing and 100 billion heartbeats monitored. (Owlet Baby Care, 2016a)

Indeed, on their website's homepage, the relatively sparse text manages to mention the expression "peace of mind" no less than five times, directly appealing to the affective intensity of early parenthood to sell these devices. An embedded video on the Owlet homepage of a CNBC story about the app adds another three uses of "peace of mind" (CNBC, 2016). Mentioned eight times on the home of the Owlet website alone, "peace of mind" is clearly the central sales strategy for the company. Yet while the website states the Owlet is "technology proven," having recorded 100 billion heartbeats, it is important to note that the Owlet is not, at this time, a certified medical device.

In an overview of baby wearables, David King (2014, p. 2), a clinical lecturer in pediatrics, warns that none of these devices, including the Owlet, are certified as medical tools

and that "medical professionals and consumers need to be aware that such devices have no proved use in safeguarding infants or detecting health problems, and they certainly have no role in preventing SIDS." Moreover, King argues that the prominence of these devices and rhetoric employed in the sales could easily mislead parents into believing that these are tested and certified medical equipment. Relegated to the footer of the website, underneath much larger logos linking to Owlet social media pages, the Owlet website quietly states, "Owlet is intended to provide peace of mind. It is not intended to diagnose, treat, mitigate, cure, or prevent any disease or condition" (Owlet Baby Care, 2016a). A more detailed inspection of the even less visible Terms and Conditions reveals that

> This Application, the Services and our Monitor are not medical devices and are not intended to replace, modify or supplement any prescribed medical device. Further, this Application, the Services and Monitor are not for high risk infants and are not intended to be a substitute for obtaining medical advice and/or treatment from a physician or other health care practitioner. (Owlet Baby Care, 2016b)

Notably, the Owlet Baby Care company has received US$9 million in startup funding (TechCrunch, 2015) and has received prominent recognition at technology industry events, including the Best Startup Award at CES 2016 (Lee, 2016). The combination of startup funding, which necessitates a long-term business model, and very carefully worded disclaimers which do the legal work of avoiding claims of medical certification positions the Owlet company very much as a technology and big data analysis company.

In the "Information We Collect Automatically" section, the company website notes,

> Even if you do not provide us with any of your Personal Information, we may automatically track, collect, and store other information when you use our Application or Services, including without limitation the information that is made available to us through the Application, applicable operating system, and monitoring device. We aggregate and store such information to help us compile reports as to trends and other behavior about users visiting and using the Application. We reserve the right to share aggregated information with others in our sole and absolute discretion. (Owlet Baby Care, 2016b)

Interrelated Terms and Conditions, End User License Agreements, and Privacy Policies are notoriously underread by users who agree to them (usually without being compelled to read them at all) and are often altered in ways which suit the changing needs of the company rather than users (van Dijck, 2013a, pp. 38-39). The complex disclaimers and agreements on the Owlet website suggest that the company is purposefully gathering as much data as possible, often in ways that would be far from obvious to users. As with the health apps mentioned above, the Owlet company clearly sells two commodities: first, the infant wearable itself, which is carefully pitched to parents as providing affective reassure and "peace of mind," and, second, the aggregated big data produced by the Owlet devices through surveillance of an increasingly large number of infants. These big data are then aggregated and analyzed to produce further insight and value. Indeed, from their earliest company videos, Owlet has argued that the big data generated by their devices will "help researchers find cures, causes and predictive models for infant ailments" (Owlet Baby Care, 2013). In an updated Owlet Vision video (Owlet Baby Care, 2015), the company's founders go a step further, stating "The thing that's most interesting is we're collecting the largest data set about infant health and sleep and wellness and safety that's ever been collected." The Owlet big data collection is the direct and purposeful outcome of intimate surveillance in the form of the Owlet smart sock.

For Andrejevic and Burdon (2015), the massive increase in surveillance and sensors of many kinds, generating enormous amounts of data in various forms, many of them privately owned, has led to the rise of what they term a "sensor society." The logic of the sensor society is to generate and capture as much detailed data as possible, which is then stored and aggregated. Once captured, these data can be analyzed and mined in a variety of ways, many of them not clear from the outset, even to those data scientists driving the analyses. Andrejevic and Burdon warn that while many companies claim not to capture personally identifying information—by which they usually mean full names—the type, complexity, and breadth of data being captured often mean that specific groups and individuals can, in fact, be identified through data patterns and analysis itself. The promise of anonymity, so often woven into privacy policies and terms of use, may mean increasingly little. Drawing attention to the operation of the sensor society

> redirects attention toward the infrastructures that make data collection capture, storage, and processing possible and consequently to the relations of ownership and control that shape who has access to data and who sets the parameters and priorities for using that data. (Andrejevic & Burdon, 2015, p. 31)

The Owlet infant wearable positions babies as part of this sensor society, while the marketing rhetoric and promise of "peace of mind" normalize intimate surveillance as the responsible and sensible choice for parents.

In their study of the quantified self-movement, Smith and Vonthethoff (2017, p. 11) argue that

> self-tracked data are used as a medium to generate stories *for* and *about* the body/self. But equally, the digital devices and dataflows themselves provide their own unique forms of authorship. In this way, the data-subject translates the data just as the data apps and outputs translate the actions of the self-tracker.

Extending these ideas, the interface of the Owlet app generates stories both *for* and *about* infants, but these stories are crucially also for the parents, who view the glowing green of the Owlet base station, or green indicators and reassuring measurements displayed on the app, as a story about the immediate health and well-being of their child. Yet as Jill Rettberg has warned, apps which document and capture moments, interactions, or other elements of infancy in their design can also limit the ways in which infancy is understood, conceptualized, narrated, and recorded (Rettberg, 2014). The well-being of an infant might be the story told by reassuring apps on a mobile phone and a glowing green indicator on the Owlet base station, but these indicators may well shape and alter other practices of early parenthood in ways not immediately clear. What is clear, though, is that infant wearables, of which the Owlet is for now the most well-known, are normalizing parental practices of monitoring and surveillance. The Owlet encourages an intimate surveillance in which well-intentioned parents are recording their infant's biometric data and allowing the Owlet company to aggregate and monetize this as a valuable big data resource. Moreover, the Owlet and related devices are directly associating good parenting with dataveillance which is an association that is likely to persist as a child grows.

Parental Mediation

Parents have a long history of using the web to discuss and share parenting practices, from emails, discussion groups, and online forums to, more recently, Facebook, bespoke apps, and other social media platforms (Lupton, Pedersen, & Thomas, 2016). Among these discussions, parents often share information about their children, initially as text, but more recently in a variety of forms including photographs and videos, mediating their children's initial online presence. For a small group who have built large online followings, talking publicly about their parenting practices, experiences, and children has seen them shift into what have alternatively been called micro-celebrities or influencers (Abidin, 2015a, 2016). Micro-celebrity is the result of purposeful self-presentation strategies online which often utilize the same techniques as marketing and branding campaigns, but at a smaller and seemingly more intimate or personal level as a means to increase their online popularity and ongoing audience (Marwick, 2013; Senft, 2013). In terms of parenting micro-celebrities, some have emerged from other fields, bringing a certain level of popularity with them, while others have grown their online attention from the ground up. While often purposefully and explicitly attempting to use their online presences to make a living, micro-celebrities are often seen as very authentic online voices, and this sense of authenticity often helps maintain their audience levels. It also means that micro-celebrity parents can be quite influential in promoting and normalizing certain shifts in parenting practices. The combination of a specific focus on parenting and seeming authenticity of their voices situates parental micro-celebrities as affective amplifiers, having significant influence at a time when new parents in particular are seeking information and direction online.

One of the strategies employed by the Owlet company is to sponsor parental micro-celebrity reviews of the Owlet monitor. A cursory review of the Owlet blog shows that the company often does wrap-up posts where they mention four or five micro-celebrities who have reviewed the Owlet in the previous month. *Happily Eva After* is written by Eva Amurri Martino, who is a popular parental micro-celebrity and also an actress coming from a Hollywood family and has over 58,000 followers on Instagram. She wrote a post in June 2016 entitled "Peace of Mind with Owlet Baby Care"(Martino, 2016) in which she talked about challenges she faced getting enough sleep with her previous baby and how the Owlet will help by giving her "peace of mind (and a much more restful sleep!)." The post includes a number of photographs of Martino cradling the smart sock and positioning it on top of a onesie purchased for her child, due later in the year. The photographs and text are written in glowing terms, and the post ends with a bespoke link to purchase the Owlet with an instant discount for people coming from Martino's post. A brief examination of another five micro-celebrity reviews of the Owlet follows a similar layout and formula. On *Positively Oakes*, Oakes' review notes that her baby "still wears hers and it gives me peace of mind and the ability to sleep better and get more done during the day" (Oakes, 2015) and her post similarly has some well-shot photographs of her baby wearing the Owlet and ends with a "readers" discount. While it is true that whenever any money is involved, the question of sponsorship and advertising inevitably influences in some way what a parental blogger will share online (Blum-Ross & Livingstone, 2016), the point here is not a critique of the commerciality of micro-celebrity parents. Rather, I seek to emphasize the formulaic way that the Owlet is reviewed, with the same style of photography and text, and that the same expression "peace of mind" that dominates the Owlet's official marketing material so readily reappears on reviews by parental micro-celebrities. Readers of *Happily Eva After, Positively Oakes*, or any of the other parental micro-celebrities are likely to be aware that these are sponsored comments, but the frequency with which stock phrases and images appear, and consistency of the message, goes a long way toward normalizing ownership of the Owlet and the associated surveillance and monitoring. Parental micro-celebrities are thus affective amplifiers, functioning as curators of information, taste, and changing parenting practices.

One of the most visible examples of micro-celebrity parental mediation occurs when parents do not just post *about* their children, but post *as* their children, using social media accounts in their name, becoming what Crystal Abidin (2015b) has dubbed "micro-microcelebrities." The 2016 Rio Olympics saws the emergence of one such micro-microcelebrity, Boomer Phelps, the infant son of Olympic swimmer Michael Phelps

and Nicole Johnson. Phelps and Johnson are both celebrities in their own right, with sizable followings on Instagram, 3.1 million and 427,000 followers, respectively. Debuting Boomer's Instagram account shortly after his birth, in the lead up to the 2016 Rio Olympics, *The Daily Mail* announced that "Boomer makes a splash on social media as his dad heads to the pool for first day of competition" (Wilkinson, 2016), while *The Hollywood Reporter* went a step further declaring the baby "Rio's accidental style icon" (Reed, 2016). Boomer's account features him often doing fairly typical baby things, in outfits, or playing, but also includes his parents and photographs with celebrities including Simon Cowell and Jimmy Fallon (taken when his father was appearing on their shows). His Instagram account gained almost 200,000 new followers during the Olympic Games and now eclipses his mother's account, with 753,000 followers. It is notable that Boomer's Instagram account has a blue tick, indicating it is an account verified by Instagram which implies that Instagram's policies support parents running accounts for their children, under their children's names, at least in the case of celebrity parents. Some micro-celebrities, and certainly most celebrities, have access to advice about posting material online, or agents and publicists who manage the process. While explicitly located within commercial practices, their children are nevertheless purposefully publicized in a considered way. However, the many followers of these parental micro-celebrities, and their micro-microcelebrity offspring, are less likely to have access to that advice, but may be strongly influenced to replicate the mediation and sharing of their own children, following these normalized examples. That is not to say followers will directly and exactly mimic micro-celebrities, but rather the climate for sharing online is informed and contextualized by these sharing practices in a way which makes publicly sharing images and details of children's lives online more and more acceptable and mundane.

Conclusion and Future Work

Like pregnancy apps, infant wearables and related devices and practices contribute to the ongoing datafication of infancy, where infants are rendered as data which simultaneously provide reassurances about their well-being to parents while being aggregated and analyzed as elements of big data sets. The line between medical devices and wearables that rhetorically provide peace of mind remains a blurred one, but the rapid increase in the popularity of infant wearables makes it all the more important for parents to be aware of both the limitations of these devices and the amount of information they are giving away about infants during their use. Parental mediation of infants by parental micro-celebrities can normalize the public sharing of stories, images, videos, and other media featuring infants, at times using accounts in infants' names. So, too, can the opinions and sponsored reviews of micro-celebrity parents situate them as affective amplifiers, promoting practices and devices, such as the Owlet monitor, which specifically encourage the surveillance of infants as a form of care? These various practices culminate in the normalization of intimate surveillance, where to monitor, mediate, and publicly share media about infants become markers of good parenting and culturally appropriate levels of care. Unplugged parenting is likely to be increasingly positioned as both irresponsible and aberrant.

As infants grow into young children, they will inevitably start to become conscious of the role of surveillance in their lives and the extent to which their lives are shared online. For them, intimate surveillance may be an indication of their parents' affection or may be a moment to start resisting their representation and datafication as their agency and self-awareness increase. For now, further work in this area is urgently needed not only to map how widespread intimate surveillance has become, but also, importantly, to surface, document, and share resistant practices which seek to limit the generation and sharing of data about infants and better inform parents and loved ones about best practice in making choices about monitoring and mediating their children.

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Author Biography

Tama Leaver (PhD) is an associate professor in the Department of Internet Studies at Curtin University in Perth, Western Australia. His research currently focuses on the "ends of identity" online, spanning ultrasound sharing and infancy online at one end, through to digital death at the other.