INFERENCES AND THE RIGHT TO PRIVACY[1]

In this paper, I defend what I call the 'Inference Principle'. This principle holds that if an agent obtains some information legitimately, then the agent can make any inference she wants based on the information, without violating anyone's right to privacy.[2] This principle is interesting for at least three reasons. First, it constitutes a novel answer to the timely question of whether the widespread use of 'data analytics' to infer personal information about individuals is morally permissible.[3] Second, it contradicts what seems to be a common view of inferences' ability to violate privacy rights. Third, it offers an account of the theoretically underdeveloped issue of what duties are engendered by the moral right to privacy with regards to inferred information.[4]

State-of-the-art data analytics makes it possible to accurately infer all sorts of personal information about individuals, based on big data sets containing seemingly trivial information, such as what car people drive, who their friends are, what groceries they buy, etc. Statistical correlations in the datasets reveal 'new' information about individuals, such as their political views, credit worthiness, or health conditions.[5] The inferences are often used to develop machine learning models that predict the behavior of individuals. Political campaigns try to predict who individual electors will vote for, banks

[1] I would like to thank Kasper Lippert-Rasmussen, Reuben Binns, Simon Laumann Jørgensen, Jens Damgaard Thaysen, Jes Lynning Harfeld, Jørn Sønderholm, Rasmus Uhrenfeldt, Lauritz Munch, and an anonymous reviewer for very helpful discussions of earlier versions of this paper.

[2] By 'legitimate' I mean normatively legitimate, not epistemically legitimate.

[3] In recent years, there has been a legal discussion on whether inferences of personal information should be covered by the legal right to privacy (Wachter 2019; European Court of Justice 2017; Wachter & Mittelstadt 2019). To the extent that law should reflect morality, the Inference Principle has direct implications for this legal discussion.

[4] Throughout this paper, I shall assume for the sake of argument that privacy rights exist. I shall not commit to any particular view on what a moral right in general consists in, or what the relation in general is between rights and duties. Neither shall I commit to any particular view on whether the right to privacy is an absolute right or not.

[5] Barocas & Nissenbaum 2014, p. 44.

try to predict if individuals will default on a loan,[6] insurance companies try to predict what health problems individuals will suffer from,[7] authorities try to predict the risk of recidivism for individual prisoners who apply for parole,[8] and Facebook and other tech companies infer the preferences of individuals, in order to target them effectively with advertisement.[9] Data analytics techniques are used in a large variety of domains, and they influence more and more parts of our daily lives.

A common view in both philosophy, law, and computer science, is that the inferences of personal information infringe upon or violate individuals' privacy rights[10], when the relevant individuals did not intend to disclose the *inferred* information.[11] The idea seems to be that by training the machine learning models, personal information about individuals is accessed illegitimately, and that this is so, even if the inferences are based solely on publicly available information, or on information that the individual has shared voluntarily. Benedict Rumbold and James Wilson have recently put this view as follows:

> […] we think that it is important to have an account of the right to privacy that at least makes it intelligible that such uses of information could violate

[6] Turkson et al. 2016; Kearns & Roth 2020.
[7] Price & Cohen 2019.
[8] Berk & Hyatt 2015. See also Lin et al. 2020 for recent skepticism about the accuracy of these algorithms.
[9] Tadesse et al. 2018.
[10] There is no consensus in the literature on what the right to informational privacy is, and what counts as a violation of this right. So-called control theorists believe that an agent's right to privacy is violated when she loses the right kind of control over her personal information (or over the access to this information). For different versions of the control theory, see e.g. Moore 2003; Moore 2010; Inness 1992; Fried 1968; Parent 1983; Marmor 2015; Mainz & Uhrenfeldt 2020; Menges 2020. So-called access theorists often add the extra necessary condition that someone must actually access the agent's personal matters in order for her right to privacy to be violated. See e.g. Thomson 1975; Macnish 2018; Lundgren 2020. For present purposes, I shall remain agnostic about which of these theories, if any, is true. However, the argument I make in this paper may have revisionary implications for some of these theories.
[11] Wachter 2019; Wachter & Mittelstadt 2019; Rumbold & Wilson 2019; Alben 2020; Barocas & Nissenbaum 2014; Kröger 2019.

> privacy— that there can be cases in which an individual's right to privacy could be violated by the appropriation and dissemination of information either that they themselves have made public or that has been inferred from information they have made public.[12]

Pace Rumbold and Wilson, the Inference Principle implies that an inference does not constitute a privacy violation, if the individual whom the information is about, has waived her right to privacy over the original information, on which the inference is based. Importantly, the Inference Principle does not imply that inferences cannot constitute privacy violations *simpliciter*. But since information is 'closed under entailment' – as logicians say[13] - an individual who waives her right to privacy over some information also waives her right to privacy over any information that is inferred from it.[14] Thus, if the Inference Principle is true, then it has implications for the moral permissibility of using data analytics to infer personal information about individuals. To wit, if the Inference Principle is true, then inferences of personal information constitute privacy violations far less often than we might think.

The paper proceeds as follows: In section I, I present and defend the Inference Principle. In section II and III, I present and reject two objections to my argument. Finally, in section IV, I make a few concluding remarks.

I. THE INFERENCE PRINCIPLE

[12] Rumbold & Wilson 2019, p. 3.
[13] Floridi 2006, p. 116.
[14] To be clear, this is not to suggest that inferences cannot *diminish* an agent's privacy in a non-normative sense.

According to the

> **Inference Principle:** If an agent obtains some information legitimately, then the agent can make any inference she wants based on the information, without violating anyone's right to privacy.[15]

If an agent Q obtains information α and information β about agent P legitimately, and γ can be inferred from α and β, then Q can infer γ without violating P's right to privacy.[16] Let us consider an example. Suppose that Smith tells Tom over the phone that Smith is on dialysis in his living room. Smith also sends Tom pictures of himself being connected to the dialysis machine. Tom is a medical doctor, and he knows that the only reason why one is on dialysis is that one has dysfunctional kidneys.[17] Smith is unaware of this fact. Tom now makes the inference that Smith has dysfunctional kidneys. To make the inferences, Tom applies the standard logical inference rule of *conditional elimination* to α and β, and infers γ:

> (α) Smith is on dialysis.
>
> (β) If one is on dialysis, then one has dysfunctional kidneys.
>
> (γ) Smith has dysfunctional kidneys.[18]

[15] Note that the Inference Principle does not only involve 'personal' information. One reason for this is that it is notoriously difficult to distinguish personal information from non-personal information. A second reason is that pieces of information that are clearly personal can often be inferred from pieces of information that are clearly non-personal (Barocas & Nissenbaum 2014, p. 55). A third reason is that the principle also covers information that is completely non-personal in nature, regardless of where we draw the line between personal- and non-personal information.

[16] The principle concerns *agents* in general, not only individuals. Nevertheless, throughout the paper, I will mostly talk about information about individuals, and inferences made by individuals.

[17] For the sake of argument, set aside the off chance that Smith is on dialysis only because he likes it, has been forced to do it, or something similar.

[18] Conditional elimination is the inference rule at work in standard modus ponens arguments of the form 'if p then q, p, therefore q'. It makes no relevant difference what exact inference rule is at play, or if the inference rule is a deductive one or not. The reader can easily construct different inferences involving different inference rules.

Tom obtains legitimately the information that Smith is on dialysis in his living room. Plausibly, Tom obtains this information legitimately because Smith has waived his right to privacy over the information by intentionally disclosing the information to Tom.[19] Tom also obtained legitimately the information that if one is on dialysis, then one has dysfunctional kidneys. The reason why it was legitimate for Tom to obtain this information is that Tom has read it in a standard medical textbook. According to the Inference Principle, Tom may infer the information that Smith has dysfunctional kidneys without violating Smith's right to privacy. He simply applies a standard logical inferences rule to α and β in his mind, and infers γ. Thus, Tom does not violate Smith's right to privacy. This is so, even if Smith is unaware of the fact that the only reason why one is on dialysis is that one has dysfunctional kidneys, and even if Smith does not want Tom to know that he has dysfunctional kidneys. This seems to be an intuitively plausible result.[20]

One can straightforwardly substitute {α,β} with any other set of legitimately obtained propositions containing information that is covered by the right to privacy, say, {α',β'}. No correct inference to proposition {γ'} from the substituted propositions will

[19] There are two competing views in the literature on what it takes to waive one's right to privacy. The first view holds that the right to privacy is limited to information that the right-holder has not intentionally made public. For discussion of this view, see Thomson 1975; Reiman 1976; Fried 1968; Schoeman 1984; Parent 1983; Ryberg 2007. The second view holds that the right to privacy at least sometimes extents to information that the right-holder has intentionally made public. For discussion of this view, see Nissenbaum 1998, 2009; Stahl 2020; Timan et al. 2017; Roessler 2016; Newell et al. 2018; Moreham 2006; Reidenberg 2014; Rumbold & Wilson 2019; and Margulis 2003. For the purpose of this paper, I need not commit to a particular view on what is required to waive one's right to privacy. *Regardless* of what the correct view is, the Inference Principle implies that *if* an individual holds some information in accordance with this view, *then* the individual may infer any information from it without violating anyone's right to privacy. I remain non-committal about what is required in order to come to hold the original information legitimately.

[20] What if Tom had *asked* for information (α) and (β) knowing that he can draw inference (γ) from, while knowing that Smith does *not* know this, and while Smith would prefer that Tom did not know (γ)? In this case, we might say that Tom had obtained information (α) and (β) *illegitimately* by deceiving Smith, and that the Inference Principle therefore does not apply. I thank an anonymous reviewer for suggesting this point to me.

constitute a violation of anyone's right to privacy.[21] The principle also generates plausible results when the inference in question is not made in someone's mind but by, say, training a machine-learning model.

Consider an example. Jones owns a pickup truck, and Tim is the neighbor of Jones. Jones is proud of his car, and he frequently bores Tim with technical details about the car. Tim works as a data scientist. He wants to know what the correlations are between seemingly trivial data about electors, and their political preferences. He decides to find out whom Jones is likely to vote for in the upcoming election. He gets access to large amounts of data from publicly available databases and trains an accurate machine-learning model on the data. To his surprise, Tim discovers that owning certain types of pickup trucks is a very strong predictor of voting Republican, and that owning certain types of sedans is a very strong predictor of voting Democrat.[22] Based on all the technical details about the car that Tim has listened to in the driveway, he knows that Jones owns the exact type of pickup truck that correlates very strongly with voting Republican. It so happens that Jones in fact always votes Republican. Jones does not want Tim to know his political preferences, and he is not aware that it is possible to infer his political preferences based on information about which car he drives. Tim now asks the computer to calculate the likelihood of Jones voting Republican. Based on the correlations in the dataset, and the fact that Jones owns a specific type of pickup truck, the computer runs something like the following inference:

[21] This is not to suggest that the Inference Principle only applies if one piece of information is inferred from two pieces of information. The number of members in the respective sets are not important. If, for instance, I hold the information legitimately that *all* men have a significant risk of getting testicular cancer, then I hold the information that Smith has a significant risk of testicular getting cancer without violating Smith's right to privacy.

[22] Car choice is in fact a good predictor of political preferences. Owners of pickup trucks are generally likely to vote Republican, and owners of sedans are generally likely to vote Democrat. See Gebru et al. 2017.

(α') Jones owns a pickup truck of type X.

(β') If one owns a pickup truck of type X, then one is very likely to vote Republican.

(γ') Jones is very likely to vote Republican.[23]

Tim obtains the information that Jones owns a pickup truck of type X legitimately. Plausibly, Tim obtains this information legitimately because Jones has waived his right to privacy over the information, by intentionally disclosing it to Tim. Tim also obtains legitimately the information that owning a pickup truck of type X strongly correlates with voting Republican. The reason why it was legitimate for Tim to obtain this information is that he has obtained legitimately all the data necessary for training the machine-learning model. According to the Inference Principle, it is legitimate for Tim to use his computer to infer that Jones is very likely to vote Republican. Based on information that is legitimately obtained, he simply uses his computer to infer a 'new' piece of information about Jones. Thus, Tim does not violate Jones' right to privacy. This is so, even if Jones was unaware of the fact that owning a pickup truck of type X correlates strongly with voting Republican, and even if Jones did not want Tim to know that he is very likely to vote Republican. Again, the Inference Principle generates an intuitively plausible result.

The underlying idea in the examples above is that whatever arises from an unobjectionable situation by unobjectionable steps is itself unobjectionable. This idea, of course, bears close resemblance to Robert Nozick's famous entitlement theory of distributive justice. According to Nozick, a distribution of goods cannot be unjust, if it arose from a just situation through a series of steps all of which were just.[24] Nozick criticized

[23] The model might output a precise estimation of the likelihood of Jones voting Republican. It might, for instance, output that Jones is 85% likely to vote Republican.
[24] Nozick 1974, p. 151.

'end-state principles' of justice, such as John Rawls' Difference Principle, for being ahistorical. He thought that in order to know whether a given distribution is just or unjust, we need to ask how the distribution came about.[25] If the distribution came about through a series of just steps, from a distribution that is just, then the resulting distribution is also just.

The Inference Principle resembles Nozick's point in the following way: According to the Inference Principle, it is legitimate to make an inference if the information that the inference is based on are obtained legitimately. We cannot simply ask the individual whom the information is about whether she wants the inferred information in question to be known by others. We cannot know whether the inference is legitimate without knowing how the inferred piece of information came about. If the inferred piece of information came about by making a correct inference[26] based on pieces of information all of which are obtained legitimately, then the inference is legitimate as well, even if the individual does not want the inferred information to be known by others. The basic idea of the Inference Principle is that if all steps in the process that leads to agent Q inferring information γ are legitimate, then it is difficult to see how it can suddenly be illegitimate for Q to infer γ. In the case of Smith and Tom, Tom obtains all the information relevant for making the inferences about Smith legitimately, and he makes the inference correctly. It is difficult to see how it then becomes illegitimate for Tom to infer the information that Smith has dysfunctional kidneys, given that all the steps that lead to Tom inferring this information were themselves legitimate.

Of course, Nozick's entitlement theory is controversial, and the Inference Principle might therefore inherit its controversiality. For any shortcoming the entitlement theory

[25] Nozick 1974, p. 153-155.

[26] If the inference was not made correctly, then it might have generated a false belief in Tom's mind. Theorists who follow Prosser's theory of the right to privacy might argue that this would violate Smith's right to privacy (Prosser 1960, p. 389). I find it strange, though, that producing false beliefs about other people should violate their right to privacy, but for the sake of argument, I simply stipulate that Tom makes the correct inference.

might have, we might worry that the Inference Principle inherits the same shortcoming. I will offer a few comments in mitigation of this worry.

Some of the well-known replies to objections against the entitlement theory also work as replies to objections against the Inference Principle. Think for example of what we might call the 'Rectification Objection'. According to this objection, the distributions of many goods in the real world have historically *not* been distributed in accordance with the entitlement theory, and that current distributions of these goods are therefore unjust.[27] The corresponding objection against the Inference Principle holds that the ways in which private companies and governments in the real world have acquired individuals' personal information are illegitimate, and therefore the inferences they draw from them are illegitimate as well. Nozick's reply to the Rectification Objection against the entitlement theory is to concede that many goods should indeed, one way or another, be redistributed to their legitimate owners, or that at least the individuals who are worse off due to the historical injustices should somehow be compensated.[28] A similar reply works to the corresponding objection to the Inference Principle. Although endorsing the Inference Principle does not imply this, I can simply concede that much of the personal information that real life inferences are based on, are obtained illegitimately, and that the inferences based on them are thus illegitimate as well.

Even though the Inference Principle does not imply that inferences based on illegitimately obtained information are themselves illegitimate, the principle *does*, however, imply the following by contraposition: *If* γ is obtained illegitimately, then either α or β - from which γ is inferred - is also obtained illegitimately. If making the inference constitutes a further violation of the right to privacy, then it is because a violation already

[27] See Nozick's own discussion of this objection in Nozick 1974, p. 152-153.
[28] See Nozick 1974, p. 228-231.

occurred in the process leading up to the inference. But, the Inference Principle neither implies that the inference *does* constitute a violation of the right to privacy, nor that it *does not* constitute a violation of the right to privacy. It is simply silent on the matter.

Here is yet another reason why the Inference Principle is not vulnerable to the classic objections against the entitlement theory: even very unequal distributions of personal information do not generate the same intuitions of injustice as very unequal distributions of primary goods do to many people. If agent Q comes to hold a lot of personal information about agent P, while agent R holds no personal information about P, then - under normal circumstances - this does not generate the intuition that the distribution of personal information is unjust. It is perfectly consistent to be an egalitarian with respect to primary goods, while still endorsing the Inference Principle. Even the Lockean proviso does not apply when it comes to personal information. It would be strange to claim that the fact that Q acquires a certain amount of personal information about P is unjust because it does not leave 'enough and as good' for R. Even if the proviso did apply, it would be easily satisfied given that information is generally a non-rivalrous good, which Q can have and use without preventing R from doing the same, and vice versa.[29]

Before closing this section, let me offer two additional reasons for why the Inference Principle is plausible. The first reason is that if Tom violates Smith's right to privacy by making the inference about Smith's medical condition, then it implies that having certain thoughts in one's mind can – in itself – constitute *rights violations*. This view is very controversial. Many theorists maintain that having thoughts in one's mind does simply not seem to be the type of action that can constitute rights violations. One may have certain racist thoughts, but merely having these thoughts does not violate the rights of anyone. If these racist thoughts cause one to perform conduct that discriminate against

[29] Mainz 2020, p. 5.

members of a certain race simply because they are members of that race, then the discriminating conduct may constitute rights violations. But, having the thoughts that caused one to perform the conduct does not *in itself* constitute a rights violation.[30] I think this view is correct, but my argument does not rest on it. If the reader believes that having certain thoughts in one's mind can be wrongful or even violate the rights of others, then it does not undermine my argument – it only limits the scope of the argument. To see this, note that in the example of Jones and Tim, no inference is made in the mind of Tim. He merely lets the machine-learning model do all the work for him, and then looks at the output data of the algorithm and forms a belief based on it. Still, he does not violate Jones' right to privacy. If Tim comes to believe that Jones will vote Republican, but Tim has no idea how the algorithm reached this result, it would be strange to hold that Tim has now violated Jones' right to privacy.

This idea is reflected in the oft-cited assumption in the privacy literature that 'simply knowing' something about an individual is not sufficient to violate the individual's right to privacy. Judith Jarvis Thomson, for instance, writes:

> I should say straightaway that it seems to me none of us has a right over any fact to the effect that that fact shall not be known by others. You may violate a man's right to privacy by looking at him or listening to him; there is no such thing as violating a man's right to privacy by simply knowing something about him.[31]

[30] Some authors do indeed seem to think that having certain thoughts can be harmful to others, because of downstream consequences caused by the thoughts (See Mendlow 2018; Dan-Cohen 1999; Morris 1976). Others believe, perhaps controversially, that having certain thoughts can be wrongful in itself, despite the lack of any upstream or downstream explanations (Schroeder & Basu 2018). Schroeder & Basu touch upon the idea that having certain *beliefs* about others may violate their right to privacy (Schroeder & Basu 2018), but the standard view seems to be that beliefs cannot constitute rights violations.

[31] Thomson 1975, p. 307.

This assumption has been echoed by many others.[32] The assumption essentially holds that we do not have privacy duties to not have certain believes about others, or at least that simply having a belief (even if the credence in the belief amounts to knowledge) about someone cannot *in itself* amount to a failure to comply with a duty strong enough that it constitutes a violation of the right to privacy.[33] Following the literature, I shall assume that this is a plausible assumption.

The assumption is relevant for the plausibility of the Inference Principle for the following reason: if simply knowing something about an individual cannot in itself constitute a violation of her right to privacy, then it is all the more plausible that for any conduct that constitutes a violation of the right to privacy, the conduct must occur in the *process* that leads to the formation of knowledge (or something similar) about the individual. And, if this process consists only of steps all of which are legitimate, then it is all the more difficult to see where the wrongness that makes up the violation comes from. If the mere fact that Tom knows γ about Smith cannot constitute a violation of Smith's right to privacy, and the way in which Tom obtained α and β, from which γ is inferred, is legitimate, then it is difficult to see how Tom violates Smith's right to privacy.[34]

[32] See e.g. Marmor 2015; Kappel 2013; Persson & Savulescu 2019. See, however, Munch 2021a for a critical discussion of this assumption.

[33] Plausibly, we do, however, sometimes have duties to have certain beliefs about others. However, many of these duties are explained by their downstream consequences. One may for instance have a doxastic duty to have a certain belief, if forming this belief is necessary to perform an action that one has a duty to perform. To illustrate, a medical doctor who has a duty to treat a patient has an appertaining doxastic duty to form a belief about, say, what disease the patient suffers from. Similarly, one may have a doxastic duty *not* to form certain beliefs, if not forming such beliefs if necessary to perform an action that one has a duty to perform. The medical doctor may have a doxastic duty not to form the belief that the patient suffers from a disease that she does not suffer from. However, failure to comply with doxastic duties like these does not, in itself, constitute a violation of a moral right to privacy.

[34] Note that on some views of the justification of privacy rights, the explanation for why some steps that lead to Q holding α, β, or γ are illegitimate have to do with the *consequences* of Q holding α, β, or γ. For instance, some privacy scholars think that the right to privacy is explained by an urgent moral interest in exercising control over how we present ourselves to others (See Marmor 2015). Other privacy scholars think the right to privacy is explained by an interest in avoiding that our

This concludes my positive defense of the Inference Principle. Before proceeding, let me stress that even if my positive argument for the Inference Principle is unpersuasive or leaves many questions unanswered, I believe that it suffices because the arguments for the *negation* of the Inference Principle are even less persuasive – at least in the versions that have been explicitly endorsed in the literature. In the following sections, I present two objections to my argument that each gives reason to think that the negation of the Inference Principle is true. If I succeed in refuting these objections, then we have good reason to think that the Inference Principle is at least as plausible as its negation.[35]

II. THE INTENTIONALITY OBJECTION

Rumbold and Wilson argue that just because P has intentionally made α and β public, and Q infers γ from α and β, it does not mean that P has waived her right to privacy over γ with regards to Q. Whether P has waived her right to privacy over γ depends on whether P intended γ to be public as well, when P intentionally made α and β public.[36] Simply put, Rumbold and Wilson believe that the waiving of privacy rights over information tracks intentionality.[37] The right to privacy over a piece of information is waived if, and only if,

personal information is somehow misused or exploited (See Parent 1983; Munch 2020), or because others' access to our personal information somehow detriments our ability to autonomously form our identities, or detriments our ability to make autonomous decisions (See Feinberg 1986; Taylor 2002).

[35] Of course, there may be other objections to my argument. One candidate might be derived from the view recently defended by Lauritz Munch (2021b). He defends what he calls the 'symmetry thesis'. According to this thesis, there are no good reasons to think that there are any privacy-related normative differences between standard cases where someone accesses someone else's information by using an X-ray device, and cases where the exact same information is accessed through the means of statistical inferences. It is beyond the scope of this paper to provide a satisfying reply to Munch's argument. However, I think that the Inference Principle offers a plausible explanation for why we often find X-ray cases objectionable, and statistical cases unobjectionable: If the information that the inference is based on are obtained legitimately, then the inference does not constitute a privacy violation.

[36] For a similar point, see Floridi 2006, p. 116.

[37] Rumbold & Wilson 2019, p. 12.

the claimant intended that piece of information to be public, regardless of whether the information is inferred from some other information.

Rumbold and Wilson begin their argument with a critique of Thomson. Thomson claims that the right to privacy does not cover information that one has voluntarily disclosed. To illustrate her view, she gives the following example: Suppose you own a picture of yourself. You have a right that others do not look at the picture. Now consider the following options you have with regards to your picture and other people's access to it. You might

> (1) invite others to look at it,
>
> (2) get others to look at it whether they want to or not,
>
> (3) let others look at it,
>
> (4) absentmindedly leave it somewhere where others would have to go through some trouble to look at it, or
>
> (5) absentmindedly leave it somewhere where nobody could reasonably be expected to know that it was owned by someone.[38]

According to Thomson, you have waived your right to privacy in (1)-(5). In (1), (2), and (3), the right is waived *intentionally*, and in (4) and (5) it is waived *unintentionally*. Thomson's view captures the intuition that if I, for instance, walk down the street, then other people do not violate my right to privacy when they look at me. They may get access to all sorts of information about me, like information about what clothes I wear, what physical disabilities I have, etc. But, because I intentionally make this information public

[38] Thomson 1975, p. 301.

by walking down the street knowing that others can easily get access to the information, it seems strange to claim that they now violate my right to privacy when they look at me.

Rumbold and Wilson argue, pace Thomson, that it is generally impossible to waive one's rights unintentionally:

> In particular, it seems odd to claim that one could waive a right unintentionally. Rather, if one is to waive a right, one would seem to need actually to waive it—the very notion of 'waiving' implying an intentional action on the part of the relevant agent with regard to their right.[39]

Thus, Rumbold and Wilson believe that the right to privacy actually covers (4) and (5). Supposedly, it is the absentmindedness of the right-holder that leads Thomson to conclude that the right to privacy is waived in (4) and (5). But, as Rumbold and Wilson point out, absentmindedness normally entails neither waiving nor forfeiture of rights. Just because you absentmindedly leave the car keys in your car, it does not mean that you have waived or forfeited your property rights over the car.[40] If someone drives away in the car, he is a car thief and not the happy owner of a new car.

The next step in Rumbold and Wilson's argument is to claim that Thomson's logic must also "... cover anything anyone might infer from looking at the picture".[41] For example, they say, if the picture is of you in high school, someone might be able to infer, with a varying degree of accuracy, which school you went to, how happy you were at that time etc.[42] If you have a right that others do not look at the picture, then presumably you also have a right that they do not infer any information from looking at the picture. If so,

[39] Rumbold & Wilson 2019, p. 10.
[40] Rumbold & Wilson 2019, p. 15.
[41] Rumbold & Wilson 2019, p. 4.
[42] Rumbold & Wilson 2019, p. 14.

then presumably you also waive your right to privacy over the inferred information, when you waive it over the picture. Thus, according to Rumbold and Wilson, Thomson's view entails the Inference Principle – although they do not use this terminology.

Rumbold and Wilson find the Inference Principle implausible. They support their view by use of the following hypothetical:

> Imagine Annabel. Annabel is a famous actress. She also suffers from a rare and very hard to diagnose genetic disorder, a piece of information about herself she wishes to keep private. One day, Annabel agrees to take part in a new medical initiative. The primary purpose of the initiative is to promote the donation of genetic code for research purposes. As a participant in the initiative, Annabel agrees to donate her DNA to medical science and, to allay the public's worries about genetic research, even agrees to post it on the internet, together with a note advertising the fact that it is hers. Unbeknownst to Annabel, however, by posting this information on the internet, Annabel also makes it possible for those trained in genetic medicine to deduce that she suffers from her rare genetic disorder. Brian is one such researcher and, having studied Annabel's DNA, decides to go to the papers to publicize that fact.[43]

If Rumbold and Wilson's view is correct, then Brian violates Annabel's right to privacy. The information about her genetic disorder was inferred from the public DNA profile, but Annabel did not intend to make the information about the genetic disorder public. So, Brian violates Annabel's right to privacy by making the inference, according to Rumbold and Wilson. Rumbold and Wilson in effect treat the Annabel case as a counterexample to the

[43] Rumbold & Wilson 2019, p. 14.

Inference Principle. So, if Rumbold and Wilson's view is true, then the Inference Principle is false.

I think that there are good reasons to reject Rumbold and Wilson's view. The first reason is that it rests on a questionable assumption. Recall that Rumbold and Wilson assumes that it is generally impossible to waive a right *unintentionally*. But, this assumption is not nearly as obvious as Rumbold and Wilson seem to think. As Lauritz Munch has recently pointed out, some accounts of consent imply that it is indeed possible to waive a right unintentionally:

> Their argument [Rumbold and Wilson's, red.] relies on appealing to the thought that rejecting their view allows for cases in which people would have waived their (privacy) rights without doing so intentionally, which they deem theoretically problematic. However, it is not clear what precisely is the theoretical cost of accepting the possibility of some such cases. Plausibly, any account of consent under which consent is an act of communication must allow that there is sometimes a disconnect between people's intentions and the communicative act that validly instantiates the consent […].[44]

Communication accounts of consent allow for unintentional waiving of rights, at least in some cases. On such accounts, the right-holder's intentions can be misaligned with what is actually communicated.[45] If Smith by his own actions communicate consent to Tom accessing his medical information, then Smith has plausibly waived his right to privacy

[44] Munch 2021b, p. 3780.
[45] However, as Munch notes, it is presumably desirable to minimize the occurrences of such misalignments. See Bolinger 2019 for discussion of this.

over this information with regards to Tom, even if Smith never intended to do so. On such accounts of consent, it is perfectly consistent to hold – as the Inference Principle implies – that it possible to unintentionally waive one's right to privacy over some inferred piece of information, if one has waived one's right to privacy over the information on which the inference is based. It thus seems theoretically uncostly to reject the assumption on which Rumbold and Wilson rest their argument.[46]

There are further reasons to be skeptical of Rumbold and Wilson's view. As they acknowledge explicitly, it is a strange implication of their view that making an inference from legitimately obtained information can violate the right to privacy. They write:

> However, it is also clear that at this point our model faces certain difficulties. For example, imagine that, rather than posting her DNA on the internet, during a party Annabel happens to bump into Sherlock Holmes. As the world knows, Holmes is a master of both observation and deduction and, during their conversation, he is able to deduce by mentally interrogating a series of stories Annabel tells him that she suffers from the rare genetic condition that she has tried so desperately to keep private. What kind of duties might Holmes be under at this point? On our model, it is not just that Holmes is under a duty to refrain from publicizing Annabel's condition but, perhaps more surprisingly, that he infringes (possibly even violates) Annabel's right to privacy insofar as he makes any effort to deduce the nature of

[46] One might object here that when one finds out that one had communicated consent unintentionally, one should be allowed to withdraw consent. While this is plausibly true in some situations, there are also situations in which we would normally say that one should have been more careful with what one communicated. By now, many people know that when they share personal information online, the information is used to make inferences. And when people choose to withdraw their consent from, say Google, we normally think that this means that Google should not make any *further* inferences, not that they violated the data subject's right to privacy by making the inferences *in the past*. Thanks to an anonymous reviewer for pointing this out to me.

> Annabel's condition in the first place (to 'appropriate' it from information Annabel makes public).[47]

This is indeed a difficulty for Rumbold and Wilson's view, and I think they underestimate the degree to which this is so. It seems odd that not only does Sherlock violate Annabel's right to privacy if he publicizes the information about Annabel's disorder, he also violates (or at least infringes upon) her right to privacy by simply making the inference. Rumbold and Wilson's solution to this problem is to 'bite the bullet':

> In those cases, then, where we, as duty-bearers, know that a piece of once private information is private and that the relevant right-bearer has only made it public unintentionally, we find ourselves ready to bite the bullet. That is, insofar as P has been attempting to keep a given piece of information private and we, as duty-bearers, know this, we believe that it would infringe her right to privacy were we to appropriate it by inferring it from information she has made public (intentionally or not).[48]

Given that Rumbold and Wilson acknowledge that their view has a strange implication, it is puzzling that they do not seem to consider the further implications of simply biting the bullet. In relation to the case involving Tim and his inference of Jones' political preference, Rumbold and Wilson's view implies that Tim remains under an obligation not to make the inference about Jones' political preference, if Tim knows that Jones did not wish his political preference to be public. We have already seen that it is not too theoretically costly to drop the assumption that it is impossible to waive a right unintentionally. But, even if

[47] Rumbold & Wilson 2019, 13.
[48] Rumbold & Wilson 2019, p. 14.

we keep this questionable assumption intact for the sake of argument, Rumbold and Wilson's view still has a strange implication: suppose that Tim knows the correlations between owning a certain type of pickup truck, and having certain political preferences, long before Jones moves in. Suppose further that Tim knows that he would not be able to stop himself from making the inference about Jones' political preference, had he known which car Jones drives.[49] If Rumbold at Wilson's view is correct, then presumably Tim now has at least a *pro tanto* obligation to make an effort to avoid knowing which car Jones drives. When Jones comes home, Tim has an obligation to look away before he sees Jones' car. When Jones starts talking to Tim in the driveway about his new car, Tim has an obligation to put his fingers in his ears or otherwise prevent Jones from telling him what car it is.[50] Note that on Rumbold and Wilson's view, it does not even matter if Jones really *wants* Tim to know what car he drives. He can intentionally waive his right to privacy over information about what car he drives, and Tim still violates Jones' right to privacy the second he receives the information and makes the inference, according to Rumbold and Wilson's view. Similarly, if Tim has access to all the relevant information, but simply lacks the logical reasoning skills necessary to make the inference, then Tim now has at least a *pro tanto* obligation not to take an introductory logic course, or otherwise engage in activities that could teach him how to make the inference, if he knows that he would not be able to refrain from making the inference if he knew how to make it.[51] He would have a

[49] I presume that as a matter of psychological fact, it is at least sometimes *impossible* to form a certain belief *b* (or refrain from forming *b*) at will. This view, or at least something close to it, is known as 'Doxastic Involuntarism'. See Peels 2015; Antill 2020; Roeber 2019. I also presume that it is at least sometimes psychologically *possible* to know in advance that one would not be able to refrain from forming *b* if one was presented with evidence *e*.

[50] Munch has recently called a duty of this type an 'indirect doxastic duty' not to form a certain belief (Munch 2021a). It is an *indirect* doxastic duty because the duty consists in acting in a way that indirectly avoids forming the belief in question.

[51] Or, he might be under an obligation to *become* ignorant of the information about Smith that he already knows. Becoming ignorant of information that one already knows may be psychologically possible in epistemically non-drastic ways in at least some cases (Matheson 2013). But it is still

pro tanto obligation to remain ignorant of how the inference rule of *conditional elimination* works.

Now, Rumbold and Wilson might respond by saying that Tim indeed has a *pro tanto* obligation to remain ignorant about what car Jones drives, but that this obligation is rendered defunct because it would become too demanding for Tim to comply with Jones' right to privacy. After all, if you have a *pro tanto* obligation to avoid obtaining information that you cannot avoid inferring personal information from, then it becomes very difficult to interact with people in general. This over-demandingness response is available to Rumbold and Wilson, but it is a response that sits uncomfortably with their view of how strong the right to privacy is. Rumbold and Wilson seem to believe that privacy interests are so important that your privacy interests even must be protected against other people inferring - in their minds - relatively trivial information about you. But if these interests are so important, then it seems strange that Tim's obligation not to violate Jones's right to privacy is rendered defunct when Tim is able to infer *non-trivial* information about Jones' political preferences. If Jones' privacy interests are so important, then one should expect that Tim has an obligation to make significant efforts to avoid violating Jones' privacy rights. Normally, over-demandingness objections do not hold that obligations are rendered defunct when they *might* become over-demanding over time. Rather, they hold that the obligations are rendered defunct above some threshold when the duty-bearer has already complied with the obligation many times. Think for example of over-demandingness objections against Peter Singer's claim that you ought to rescue people in dire need on the other side of the globe just like you ought to save the drowning child in the pond in front

normatively controversial to hold that one can be under an obligation to become ignorant of certain information. In the case of Jones and Tim, it would be very strange to claim that Tim has an obligation to become ignorant about either the information about what car Jones drives, or the information about statistical correlations between car choice and political preferences, given that Tim has come to know both pieces of information in legitimate ways. Jones even *wants* Tim to know what car he drives.

of you. Over-demandingness objections do normally not reject that you should rescue *some* people. Rather, they hold that *at some point*, you may stop rescuing people because continuing to rescue becomes over-demanding. Similarly, we should expect that if there are over-demandingness worries at play in the case of Jones and Tim, it is that *at some point* it becomes over-demanding for Tim to make an effort to avoid obtaining information that Jones that he knows he will infer personal information about Jones from.

Rumbold and Wilson might then respond by saying that they explicitly acknowledge that if Jones gives Tim information α' and β', and Tim cannot help but to infer γ', then Tim's duty not to infer γ' is rendered *defunct*, and therefore Tim does not violate Jones' right to privacy when he infers γ'.[52] If ought implies can, and Tim cannot avoid making the inference, then Tim does not have an obligation not to make the inference. However, the situation involving Tim and Jones is different. Tim knows *beforehand* that he will not be able to avoid making the inference, if he is presented with evidence of what car Jones drives. In this case, Tim actually *can* avoid making the inference, so his duty is *not* rendered defunct on Rumbold and Wilson's view. Thus, this response is not available to Rumbold and Wilson after all.

Yet another - and possibly worse - problem with Rumbold and Wilson's view is that it (in contrast to the Inference Principle, as we have seen) has the controversial implication that having certain thoughts in one's mind can in itself constitute rights violations. Rumbold and Wilson think that Sherlock violates Annabel's right to privacy by making inferences in his mind, and thus they believe that having certain thoughts in one's mind can violate the rights of others. This implication is very controversial, although as we saw in an earlier section, some theorists would be willing to bite the bullet here. However, the burden of proof still seems to be on Rumbold and Wilson. Their argument has an

[52] Rumbold & Wilson 2019, p. 14.

implication that has the very controversial implication that making inferences in one's mind can constitute a rights violation. The onus is therefor on them, not me, to explain why we should accept this controversial implication of their view.

Now that we have seen why Rumbold and Wilson's Intentionality Objection is unsuccessful, let us now turn to what I call the 'Other-Regarding Inference Objection'. Albeit very common, this objection nevertheless turns out to be unsuccessful too.

III. THE OTHER-REGARDING INFERENCE OBJECTION

The Other-Regarding Inference Objection holds that legitimately obtained information about some individual(s) can lead to illegitimate inferences about *others*. The objection comes in several versions, but I shall focus on the version that threatens the Inference Principle the most.[53] The reader may be familiar with something like the following scenario: you go online and see, to your surprise, advertisement for your favored political party on all the websites you visit. You are surprised because you generally do your best to hide your political preferences online. You do some research, and discover that Facebook has – even though you do not have a Facebook profile yourself – inferred your political preference from information about your friends' political preferences that they have voluntarily shared online, in combination with the publicly available information that you are friends with them, and the publicly available information that friends often share political preferences.[54] You feel that Facebook violates your right to privacy by inferring your political preference. Facebook may have obtained the information about your friends' political preferences legitimately, they may have obtained legitimately the information that

[53] Another version of this objection can be found in Floridi 2006, p. 116.
[54] Facebook have created so-called 'shadow profiles' of people who do not have a Facebook profile. These profiles also contain inferred information about non-users based on information about users, and certain connections between users and non-users (Garcia 2017).

you are friends with them, and, they may have obtained legitimately the information that friends often have the same political preferences. But – the objection goes – it is not legitimate to infer *your* political preference legitimately, because you did not contribute to the information from which the inference was made.

This scenario is relevantly different from the scenario of Smith and Tom, and the scenario of Jones and Tim. In those scenarios, the right-holders *did* provide some of the information from which the inferences were made. In the case of Smith and Tom, Smith voluntarily shared with Tom the information that he was on dialysis in his living room. In the case of Jones and Tim, Jones voluntarily shared with Tim the information that he owned a pickup truck. This difference in the voluntary sharing of some of the original information makes a morally relevant difference. Or so the objection goes.

I do not think that Facebook violates your right to privacy when they infer your political preference. If Facebook's behavior counts as a violation of your right to privacy, then we all go around violating each other's privacy rights all the time in the analog world. Almost all the information we voluntarily share with others all the time can be used to infer information about third parties.[55] It makes no principled difference that Facebook makes inferences about *many* individuals, or that the Facebook's inferences are *sometimes* more accurate. Suppose that individual P tries to hide her political preference A, while her friends are very outspoken about their own political preference A. Suppose further that groups of friends are in fact very likely to have the same political preferences.[56] I know P and her friends, and I now make the inference that P has preference A. We all make similar inferences of personal information about other people. But, we do normally not think that doing so amounts to violations of their privacy rights. If making such inferences violate the

[55] Floridi 2006, p. 116.
[56] This is in fact true in many cases. See Pew Research Center 2014.

privacy rights of others, then this suggests an extremely revisionary theory of privacy rights.

I do not suggest that Facebook is not acting wrongly, all things considered. If Facebook is acting wrongly in the scenario above, then it might be because they *use* the inferences in illegitimate ways. Perhaps the 'micro-targeting' of political advertisement amounts to a problematic form of voter manipulation.[57] Or, perhaps the inferences lead Facebook's algorithms to distribute fake news and conspiracy theories to voters who are likely to believe them and vote accordingly. However, whatever may be wrong with the way the inferences are used, I do not think that merely making the inference – in itself – is illegitimate. In particular, I do not think that it violates anyone's right to privacy.

Even if I am mistaken, and Facebook's inference of your political preference *does* violate your right to privacy, the Inference Principle can in fact handle this. Recall Nozick's reply to the Rectification Objection. The reply was simply to concede that many goods should indeed, one way or another, be redistributed to their legitimate owners, or, at least the individuals who are worse off due to the historical injustices should somehow be compensated. Again, I can concede something similar. I can concede that Facebook violates your right to privacy in the process that leads to the inference, and that the inference is therefore illegitimate. One of the pieces of information that makes it possible to infer your preference, is the information that you are friends with individuals who have that preference. The way in which Facebook have historically gathered information like this in the real world is questionable at best. Facebook asks users if they want to 'import their friends' from their phones, to make it easier to connect with their friends. The potential problem is that by consenting to this, users give Facebook access to their friends' names, contact information etc., without consent from the friends.[58] Based on the information,

[57] See Susser et al. 2019 for a discussion of this view.
[58] Garcia 2017.

Facebook then infers personal information about the friends, even if they do not themselves have a Facebook profile.[59] Thus, even if Facebook violates your privacy by making the inference, I can simply concede that this is so exactly because some of the original information is obtained illegitimately, and not because the Other-Regarding Inference Objection is true.

IV. CONCLUDING REMARKS

In this paper, I have defended the Inference Principle. If this principle is correct, then it has wide-reaching implications for the moral permissibility of inferring personal information by using data analytics. So far, many commentators have claimed that the inferences of personal information violate people's privacy rights. The Inference Principle implies that this is not always so. At least in cases where the inferences are based solely on information that is obtained legitimately, the inferences do not violate privacy rights. This result is of theoretical philosophical interest, but it also suggests that the use of data analytics is morally permissible in a surprisingly wide range of cases. The Inference Principle even offers concrete action guidance to data analysts: If all the information in a database is obtained legitimately, then the data analyst can make any inference from the information without violating anyone's right to privacy. The Inference Principle also offers concrete advice to policy makers: If they want law to track morality, then privacy laws and data protection regulations should probably not be extended to cover inferences made from information that is obtained legitimately.

[59] Garcia 2017, p. 1.

Bibliography

Alben, Alexander. 2020. “When Artificial Intelligence and Big Data Collide—How Data Aggregation and Predictive Machines Threaten our Privacy and Autonomy”. *AI Ethics Journal.* 1(1): 1-23.

Antill, Gregory. 2020. “Epistemic Freedom Revisited,” *Synthese.* 197: 793–815.

Barocas, Solon. Helen Nissenbaum. 2014. “Big Data’s end run around anonymity and consent”. Privacy, Big Data, and the Public Good: Frameworks for Engagement, ed. Julia Lane, Victoria Stodden, Stefan Bender, and Helen Nissenbaum. *Cambridge: Cambridge University Press.*

Berk, Richard. Jordan Hyatt. 2015. “Machine Learning Forecasts of Risk to Inform Sentencing Decisions”. *Federal Sentencing Reporter.* 27(4): 222–28.

Bolinger, Renée. 2019. “Moral risk and communicating consent.” *Philosophy and Public Affairs.* 47: 179–207.

Dan-Cohen, Meir. 1999. “Harmful Thoughts”. *Law and Philosophy.* 18(4): 379-405.

European Court of Justice. 2017. Peter Nowak v Data Protection Commissioner Case C-434/16.

Feinberg, Joel. 1986. *The Moral Limits of the Criminal Law, vol. 3: Harm to Self.* Oxford: Oxford University Press.

Floridi, Luciano. 2006. “Four Challenges for a Theory of Informational Privacy”. *Ethics and Information Technology.* 8: 109-119.

Fried, Charles. 1968. “Privacy”. Yale Law Journal. 77(3).

Garcia, David. 2017. “Leaking Privacy and Shadow Profiles in Online Social Networks.” *Science Advances.* 3(8).

Gebru, Timnit, Jonathan Krause, Yilun Wang, Duyun Chen, Jia Deng, Erez Lieberman Aiden, and Li Fei-Fei. 2017. "Using deep learning and Google Street View to estimate the demographic makeup of neighborhoods across the United States." *Proceedings of the National Academy of Sciences.* 114(50):13108.

Kappel, Klemens. 2013. "Epistemological Dimensions of Informational Privacy." *Episteme* 10(2): 179-192.

Kearns, Michael. Aaron Roth. 2020. *The Ethical Algorithm.* Oxford: Oxford University Press.

Kröger J. 2019. "Unexpected Inferences from Sensor Data: A Hidden Privacy Threat in the Internet of Things." *IFIP Advances in Information and Communication Technology.* Vol. 548.

Lin, Zhiyuan. Jongbin Jung. Shared Goel. Jennifer Skeem. 2020. "The limits of human predictions of recidivism". *Science Advances* 6(7).

Macnish, Kevin. 2018. "Government Surveillance and Why Defining Privacy Matters in a Post-Snowden World." *Journal of Applied Philosophy.* 35(2): 417–432.

Mainz, Jakob. 2020. "But Anyone Can Mix Their Labor: A Reply to Cheneval". *Critical Review of International Social and Political Philosophy.* Forthcoming.

Mainz, Jakob. Rasmus Uhrenfeldt. 2020. "Too Much Info: Data Surveillance and Reasons to Favor the Control Account of the Right to Privacy." *Res Publica.* Forthcoming.

Margulis, S. T. 2003. "Privacy as a Social Issue and Behavioral Concept". *Journal of Social Issues.* 59(2): 243-261.

Marmor, Andrei. 2015. "What is The Right to Privacy?" *Philosophy & Public Affairs.* 43(1): 3-26.

Matheson, David. 2013. "A Duty of Ignorance". *Episteme*. 10(2): 193–205.

Mendlow, Gabriel. 2018. “Why Is It Wrong To Punish Thought?” *The Yale Law Journal.* 127(8): 2204-2585.

Menges, Leonhard. 2020. “A Defense of Privacy as Control.” *Journal of Ethics*. https://doi.org/10.1007/s10892-020-09351-1

Moore, Adam D. 2003. Privacy: Its Meaning and Value. *American Philosophical Quarterly* 40(3): 215–227.

Moore, Adam D. 2010. *Privacy Rights: Moral and Legal Foundations*. University Park: Pennsylvania State University Press.

Moreham, N. 2006. “Privacy in Public Places”. *Cambridge Law Journal.* 65(3): 606-635.

Munch, Lauritz. 2020. “The Right to Privacy, Control Over Self-Presentation, and Subsequent Harm.” *Journal of Applied Philosophy*. 37(1): 141–154.

Munch, Lauritz. 2021a. “How Privacy Rights Engender Direct Doxastic Duties.” *The Journal of Value Inquiry.* Forthcoming.

Munch, Lauritz. 2021b. “Privacy Rights and ‘Naked’ Statistical Evidence.” *Philosophical Studies.* Forthcoming.

Newell, B. I. Skorvanak. T. Timan. T. Chokrevski. 2018. “A Typology of Privacy.” *University of Pennsylvania Journal of International Law*. 38(2): Art. 4.

Nissenbaum, Helen. 1998. “Protecting privacy in an information age: the problem of privacy in public”. *Law and Philosophy*. (17): 559–96.

Nissenbaum, Helen. 2009. *Privacy in Context: Technology, Policy,and the Integrityof Social Life.* Stanford, CA: Stanford University Press.

Nozick, Robert. 1974. *Anarchy, State, and Utopia.* Basic Books.

Parent, William. 1983. “Privacy, Morality, and Law”. *Philosophy & Public Affairs.* 12(4): 269-288.

Peels, Rik. 2015. “Believing at Will Is Possible.” *Australasian Journal of*

Philosophy 93(3): 524–541.

Persson, Ingmar. Julian Savulescu. 2019. "The Irrelevance of a Moral Right to Privacy for Biomedical Moral Enhancement," *Neuroethics.* 12(1): 35–37.

Pew Research Center. 2014. "Political Polarization in the American Public." URL= https://www.pewresearch.org/politics/2014/06/12/political-polarization-in-the-american-public/ (Accessed 21-01-2021).

Price, W.N. I.G. Cohen. 2019. Privacy in the age of medical big data. *Nature Medicine* 25, 37–43.

Prosser, William. 1960. "Privacy". *California Law Review.* 48(3): 383-423.

Reidenberg, Joel. 2014. "Privacy in Public". *University of Miami Law Review.* 69(1).

Reiman, Jeffrey. 1976. "Privacy, Intimacy, and Personhood". *Philosophy & Public Affairs.* 6(1): 26-44.

Roeber, Blake. 2019. "Evidence, Judgment, and Belief at Will." *Mind*. 128(511): 837–859.

Rumbold, Benedict. James Wilson. 2019. "Privacy Rights and Public Information." *The Journal of Political Philosophy.* 27(1): 3–25.

Roessler, Beate. 2016. "Privacy as a Human Right." *Proceedings of The Aristotelian Society.* CXVII(2).

Ryberg, Jesper. 2007. "Privacy Rights, Crime Prevention, CCTV, and the Life of Mrs. Aremac." *Res Publica.* 13: 127-143.

Schoeman, Ferdinand. 1984. *Philosophical Dimensions of Privacy: An Anthology.* Cambridge University Press.

Schroeder, Mark. Rima Basu. 2018. “Doxastic Wronging”. In *Pragmatic Encroachment in Epistemology*, Brian Kim, Matthew McGrath (eds.). Routledge.

Stahl, Titus. 2020. “Privacy in Public: A Democratic Defense”. *Moral Philosophy and Politics*. 7(1): 73-96.

Susser, Daniel. Beate Roessler. Helen Nissenbaum. 2019. ”Online Manipulation: Hidden Influences in a Digital World.” *Georgetown Law Technology Review.* 4(1).

Tadesse, Michael M. Hongfei Lin. Bo Xu. Liang Yang. 2018. *”Personality Predictions Based on User Behavior on the Facebook Social Media Platform”. IEEE Access* vol. 6, 61959-61969.

Taylor, James Stacey. 2002. “Privacy and Autonomy: A Reappraisal,” *Southern Journal of Philosophy.* 40(4): 587–604

Thomson, Judith Jarvis. 1975. “The Right to Privacy”. *Philosophy and Public Affairs*. 4(4): 295-314.

Tene, Omer. Jules Polonetsky. 2013. “Judged by the Tin Man: Individual Rights in the Age of Big Data.” *Journal on Telecommunications and High Technology Law.* 11(351).

Timan, T. B. Newell. B. Koops. 2017. Privacy in Public Space: Conceptual and Regulatory Challenges. Cheltenham: Edward Elgar Publishing.

Turkson, R. E. E. Y. Baagyere and G. E. Wenya. 2016. "A machine learning approach for predicting bank credit worthiness." *Third International Conference on Artificial Intelligence and Pattern Recognition (AIPR)* 1-7.

Wachter, Sandra. 2019. “Data Protection in the age of Big Data.” *Nature Electronics* (2): 6–7.

Wachter, Sandra. Brent Mittelstadt. 2019. “A Right to Reasonable Inferences: Re-thinking Data Protection Law in the Age of Big Data and AI”. *Columbia Law Review* (2): 1-182.

Wrenn, C. 2007. “Why There Are No Epistemic Duties.” *Dialogue.* 46(1): 115-136.