The DECIDE Framework:
Describing Ethical Choices in Digital-Behavioral-Data Explorations.

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Abstract

Behavioral sciences now routinely rely on digital data, supported by digital technologies and platforms. This has resulted in an abundance of new ethical challenges for researchers and ethical review boards. Several contemporary high-profile cases emphasize that ethical issues often surface after the research is published, once harm has already occurred. Consequently, implementing safeguards in digital behavioral research is often reactionary and fails to adequately prevent harm. In response, we propose the DECIDE framework which encourages ethical reflections and discussions throughout all stages of the research process. The framework presents several questions designed to help researchers view their work from new perspectives and uncover ethical issues they might not have anticipated. We provide several resources to support researchers with their ethical reflections and discussions, including (i) The DECIDE Framework Spreadsheet, (ii) The DECIDE Desktop App, (iii) Information Documents, and (iv) Flowcharts. This article provides suggestions on how to use each resource to encourage proactive discussions of how ethical issues may apply to specific research contexts. By promoting continous ethical considerations, safeguards can be put in place throughout the research project, even after research commencement. The DECIDE framework shifts ethical reflection away from being reactive towards a more proactive endeavor, reducing the risk of harm, and the misuse of digital behavioral data.

Keywords

Digital; Ethics; Privacy; Review; Open Resources

Introduction

The digital universe is saturated with information about people, including their demographics, psychology and behaviors. Harnessing this data for research provides abundant opportunities to investigate new topics and methodologies. Yet there remain conceptual gaps amongst researchers and ethical review boards when assessing the ethical risks of such projects (Zimmer, 2018). This has been emphasized through several high profile cases whereby the publication of research has been followed by significant ethical debates (Isaak & Hanna, 2018; Schneble et al., 2018; Shaw, 2016; Van Noorden, 2020; Verma, 2014; Zimmer, 2010, 2018). When utilizing digital data generated by 'human subjects' in research, concerns largely focus on consent, anonymization, the right to privacy, the protection of vulnerable populations, and whether online data should be considered 'public' or 'private' (Isaak & Hanna, 2018; Schneble et al., 2018; Shaw, 2016; Van Noorden, 2020; Verma, 2014; Zimmer, 2010, 2018). When consulting research participants, one study found that people were more accepting of their digital data being used in academic research, than by social media companies or journalists (Hemphill et al., 2022). However, what participants considered "acceptable" depended on what parts of their data would be re-used, their understanding of who will use the data, and the reasons behind its use (Hemphill et al., 2022).

Consequently, there is an immediate need to transform research ethics into a proactive process via our DECIDE framework presented herein. In short, the framework includes a series of questions that prompt ethical discussions/reflections within research teams, and individuals. The framework advocates that ethical reflections should not end upon receipt of ethical approval from a review board but complements this by proposing ongoing reflection throughout a research project. We are not proposing continued governance (such as repeated ethical approvals) but instead DECIDE prompts informal discussions and reflections across **all** stages of a research project. Ethics is often misunderstood as a form filling process, which serves to satisfy university governance, as this is often a requirement before any research can take place. We emphasise ethics as a process, whereby the reduction in risk emerges through ongoing discussions and

reflections, which prompts a change in research practices. Whilst our guidance can inspire research governance (and thus might be useful to ethical review boards), we are deliberately describing DECIDE as a framework to support culture change, rather than a comprehensive research governance framework.

The focus of the DECIDE framework is to provide contemporary considerations for those studying digital data that is generated by human activity (e.g. purchasing goods, posting on social media) or created through the surveillance/remote sensing of individuals (e.g. CCTV data). In other words, DECIDE illuminates emerging issues with the use of digital data that provides information on "human subjects", and their behaviors. This encompasses (i) digitally exclusive behaviors which take place natively and exclusively through a piece of technology (e.g., Facebook 'like' data), (ii) digitally mediated behaviors, whereby the behaviors can be conducted without using technology, but can be mediated by technology (e.g., verbal conversations over video chat) and (iii) digitally recorded behaviors which create an electronic log of non-digital actions (e.g., using fitness apps to measure the number of steps per day) (Kaye et al., 2022). This data can be extracted in secondary data analysis projects or generated in experimental work. Therefore, the scope of DECIDE encompasses both primary and secondary data initiatives, while also considering the ethical risks associated with all stages of the research processes, such as during data collection, analysis, and sharing.

DECIDE aims to help researchers recognize the broader risks associated with their research as it remains difficult to comprehend what issues will arise during a project. This is further complicated by various and longstanding conceptual grey areas with regards to digital behavioral research:

"*While many lessons from previous ethical breaches find their way into regulatory guidelines or law, unique ethical dilemmas arise as a natural part of any research phenomenon*" (Markham, 2016).

One example grey area is whether data found on the internet is public or private, and whether that data 'should' be used in research. This was illuminated by a project which shared rich Facebook data from a cohort of Harvard students, which led to some being re-identified (Lewis et al., 2008). In response to criticisms, the principal investigator said, *"We have not accessed any information not otherwise available on Facebook"* making the argument that *"the data is already public"* (Zimmer, 2010). This example clearly shows conflicting viewpoints on whether certain types of social media data should be shared and analyzed.

Associated issues can become magnified when working with vulnerable populations. This is evidenced in a now retracted article which received public concern following the use of reddit data created by individuals in the schizophrenia community (Lyons et al., 2024). Despite obtaining ethical approval from their host university and discussing issues pertaining to anonymity and consent in their original article, this did not mitigate the ethical issues that became apparent following publication. In their retraction statement the authors reflect and discuss the difficulty in ascertaining the public or private nature of online forums. However, they also consider how some online communities are perceived as safe spaces, but for individuals with schizophrenia, gathering information from these communities can add to feelings of paranoia, and transform these into 'unsafe' places.

Researchers frequently conduct studies with the intention of minimizing harm based on their best understanding; however, the absence of clear guidelines makes them susceptible to unintentionally causing harm. This leaves researchers open themselves to negative consequences, such as public shaming, the retraction of research, and reputational damage. Therefore, the unique nature of each research project, a diverse set of guidelines (see Table 1), and evolving "grey areas" mean that existing frameworks do not adequately support researchers when navigating this type of research and related issues.

Table 1: Some existing ethical guidelines for psychological science and their scope.

Ethics body or research group	Ethical guidelines and example topics covered
The Belmont Report (The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research,1979)	Basic ethical principles: (i) Respect for persons, (ii) Beneficence, (iii) Justice.
British Psychological Society (2021)	Ethics guidelines for internet-mediated research: (i) Respect for the autonomy, privacy and dignity of individuals and communities, (ii) Scientific integrity, (iii) Social responsibility, (iv) Maximizing benefits and minimizing harm.
Association of Internet Researchers (AoIR) (2019)	Internet research ethical guidelines 3.0, example topics include: informed consent, protecting the researcher(s), legal aspects, cultural dimensions, algorithms and learning models.
Hagendorff (2020)	Reviews and analyzes 22 guidelines in AI relating to: privacy, accountability, cybersecurity, diversity, and explainability.
Hesse et al. (2019)	Principles for qualitative researchers and institutions: (i) Valuing methodological diversity, (ii) Encouraging research that accounts for and retains context, specificity, and marginalized and overlooked populations, (iii) Pushing beyond legal concerns to address often messy ethical dilemmas, (iv) Attending to regional and disciplinary differences, (v) Considering the entire lifecycle of research, including the data afterlife in archives or in open-data facilities.
Ross et al. (2018)	Ethical aspects of data sharing and research participant protections. Covers: group harms, international research, different types of data (qualitative, anthropological, geographic information systems (GIS), photographic / image, quantitative).
Dennis et al. (2019)	Aims to navigate challenges to ensure data is open while simultaneously preserving participant privacy.

Cychosz et al. (2020)*	Considers ethical principles associated with collecting, analyzing, and sharing multi-hour audio recording data. Guided by the principles of autonomy, privacy, beneficence, and justice, the authors provide ethical guidelines. Provides sample consent forms.
The Menlo Report (Kenneally & Dittrich, 2012).	Proposes a framework for ethical guidelines for computer and information security research, based on the principles set forth in the 1979 Belmont Report Adds a fourth principle, *Respect for Law and Public Interest* which involves engaging in legal due diligence.
Metcalf & Crawford (2016)	Advocates for the inclusion of data science research to undergo ethical review as human subjects research.
Paxton (2020)	Applies the three Belmont Principles to the use of "human focused" big data or naturally occurring data sets (BONDS).
Paxton (2024)	Outlines several 'calls to action' and practices for using naturally occurring data. Suggests researchers adapt ethical principles for human-subjects data to reduce risks when using naturally occurring data.
Zimmer (2018)	Outlines conceptual gaps in how internal review boards consider privacy, anonymity, consent, and harm in the context of big data research. Applies Nissenbaum's theory of contextual integrity to big data research projects.
The Declaration of Helsinki (The World Medical Association, 2025)	Provides ethical principles for medical research involving human participants, including research using identifiable human material or data.
Light et al., (2024)*	The American Psychologist dedicated a special issue on ethical challenges posed by differing digital technologies in psychological research. For example, Levine et al. (2024) explores the ethical challenges for psychologists who want to use digital visual data including public space systems and social media. Other papers in the special issue discuss associated challenges with digital community-based research, remote data collection, sensor technologies, large language models, the metaverse, de-identified digital data, and AI/ML.

*= concerns specific types of digital data

There are also large inconsistencies evident between research communities and institutional review boards both in terms of how decisions are made and what requires ethical approval. For example, not all review boards consider data scraped from the internet (e.g. public social media posts) to be "human subjects research", which therefore does not require ethical review (Metcalf & Crawford, 2016; Paxton, 2024; Proferes et al., 2021). This is then reflected back in how researchers view digitally scraped data as being seemingly decoupled from the individuals who produce it thus neglecting to consider the impacts on people, communities, and society (Metcalf & Crawford, 2016).

However, even if researchers are not directly interacting with participants throughout the research process, the same ethical considerations applicable to in-person research should still be applied (Paxton, 2024). This is because digital data generated by individuals can reflect their thoughts, perspectives, identity expressions, and motivations. Therefore, most studies that routinely rely on digital data carry ethical implications, including an individual's loss of control over their data and unauthorized processing of this data in the future, both of which can be considered a violation of someone's privacy (Zimmer, 2010). To provide support for researchers and reviewers, the DECIDE framework treats all digital behavioral data as human-subjects data (as recommended by Metcalf & Crawford, 2016), encompassing digitally exclusive, mediated, and recorded data.

In sum, without appropriate guidance, researchers may not have the expertise required to recognize the ethical issues that might arise from their research, leading to ethical questions being raised in the period after publication (here described as reactionary ethics) (Favaretto et al. 2020; Verma, 2014). This is not a helpful route to maximize the collective good within and beyond psychological science (Tiokhin et al., 2021). A lack of comprehensive ethical guidance is further compounded by the *static* process of solely addressing ethical considerations prior to research. As such, ethics are typically conceptualized in a "single event" (Head, 2020; Velardo & Elliott, 2018), and once approval has been granted, ethical implications are

seldom thought of again. Indeed, while ethics can be seen as an initial precursor (or worse still, hurdle) to research, in practice ethical dilemmas evolve and change with the progress and the opportunities of a given project. Consequently, researchers have questioned whether existing guidelines and processes are still "fit for purpose" (Favaretto et al., 2020), and have called for the implementation of dynamic guidelines that better address the challenges of working in the digital age (e.g., Anabo et al., 2019; Clark et al., 2019; Vitak et al., 2016).

In response to the above, we present DECIDE - a dynamic framework that aims to drive ethical decision making today and in the future. Specifically, DECIDE outlines key ethical questions for psychologists to consider when engaging in digital behavioral data explorations. DECIDE encourages action and reflection throughout all stages of the research process, reducing the risk of harm to individuals, and the misuse of digital behavioral data. It describes a process in which researchers can be reflexive and dialogical about their research practices. This reflective process is inspired by the Association of Internet Researchers, (2019) guidelines, which states ethics begins with "reflection on own research practices and associated risks". Therefore, ethics is a method that should be embedded in research culture, and the rest of this paper aims to outline one such method of ethical reflection.

Using the DECIDE framework

The DECIDE framework is hosted on the Open Science Framework (OSF): https://osf.io/nsgxw/. The extensive resource set contains four main components. (i) The DECIDE Framework Spreadsheet, (ii) The DECIDE Desktop App, (iii) Information Documents, and (iv) Flowcharts. A 'frozen' version of all these documents at time of publication can be found here: https://osf.io/7qkre

The DECIDE *spreadsheet* can be downloaded from the OSF and contains a list of questions for individuals or research teams to support reflection and/or discussions when embarking on a new research project (see column "Question"). The *spreadsheet* lists bespoke ethical questions for *primary* or *secondary* data considerations (see column "Type"). Every question has a related *information document* hosted on the OSF page to provide further support and discussion points (see column "Link'). These *information documents* can also be found in the files tab for the OSF project, with reference codes as titles (e.g. A1PD).

The DECIDE framework also encourages researchers to revisit each question at various points throughout a research project. To initiate this, the *spreadsheet* provides the research stage in which it would be beneficial to revisit each question (see column "Research Stage"). This is not intended to be prescriptive, but instead a useful prompt to help encourage regular reflection. To incorporate feedback from the research community, or to adapt as technology and data collection methods continue to evolve, the spreadsheet and information files can be easily updated by any author of DECIDE https://osf.io/nsgxw/.

Code	Order	Description	Type	Research Stage	Link	Question
A1PD	1	Adequacy	Primary	A: Planning Considerations	https://mfr.osf.io/render?u	Have you considered if the outlined technologies are fit for purpose,
A2PD	2	Competencies	Primary	A: Planning Considerations	https://mfr.osf.io/render?u	Are you confident that member(s) of the research team have the app
A3PD	3	Risks and Harms	Primary	A: Planning Considerations	https://mfr.osf.io/render?u	Are you confident that any perceived harms from this research have
A4PD	4	Social Value	Primary	A: Planning Considerations	https://mfr.osf.io/render?u	Has the social value of the research been considered?
B1PD	5	Actor vs Issue Centred Research	Primary	B: Consent Considerations	https://mfr.osf.io/render?u	Are you confident as to whether the research is actor centred or issu
B2PD	6	Data Context	Primary	B: Consent Considerations	https://mfr.osf.io/render?u	Have you considered if the data is public, private or both? Consent f
B3PD	7	Control	Primary	B: Consent Considerations	https://mfr.osf.io/render?u	Have you thought about obtaining consent from participants for eith
C1PD	8	Representativeness	Primary	C: Collecting Considerations	https://mfr.osf.io/render?u	Are you confident that the data is representative of the study popula
C2PD	9	Security and Storage	Primary	C: Collecting Considerations	https://mfr.osf.io/render?u	Have you decided how the data will be stored securely and in line w

Figure 1: Screenshot of the DECIDE Framework Spreadsheet

However, researchers can also engage with the DECIDE framework using *the desktop app*. A link to the *app* can be found on the OSF page. The *app* pulls in 'live' information from the *spreadsheet* and *information documents*, and therefore it is automatically updated if any changes are made to these files. The *app* supports

the easy navigation of the different ethical questions and displays information from the documents in an organized manner.

When opening the *app*, the toolbar on the left-hand side asks a researcher to indicate whether you are planning a *primary* or *secondary* data research project. If a project involves both *primary* and *secondary* data, it is recommended that a researcher completes a sperate instance of DECIDE for each individual dataset alongside a consideration of any data linkage risks.

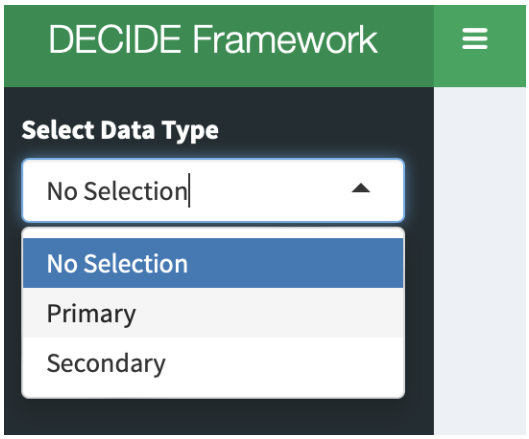

Figure 2: Screenshot of the DECIDE app allowing a researcher to indicate whether they are embarking on a primary or secondary data research project.

Once a data type has been selected, the DECIDE *app* displays two drop-down menus. The first lists several research stages. The second drop down menu presents the ethical considerations relevant to each research stage. Ethical considerations are phrased as multiple-choice questions (e.g. *"Have you considered how the findings of the research might be mis-used?")*. A researcher can respond with the answers "Yes", "No" or "Need More Information".

If “No” or “Need More Information” are selected, the app presents the researcher with further information to help them contemplate the ethical consideration in relation to their own project. The Association of Internet Researchers, (2019) guidelines state that discussions should be had against the “accumulated experience and ethical reflection of researchers in the field” and in providing additional information, we aim to mirror this guidance. The additional information provided by the app includes case examples from published studies, and sign-posts researchers to further resources to aid their ethical decision making (e.g., British Psychological Society, 2021; Caliandro & Gandini, 2017)

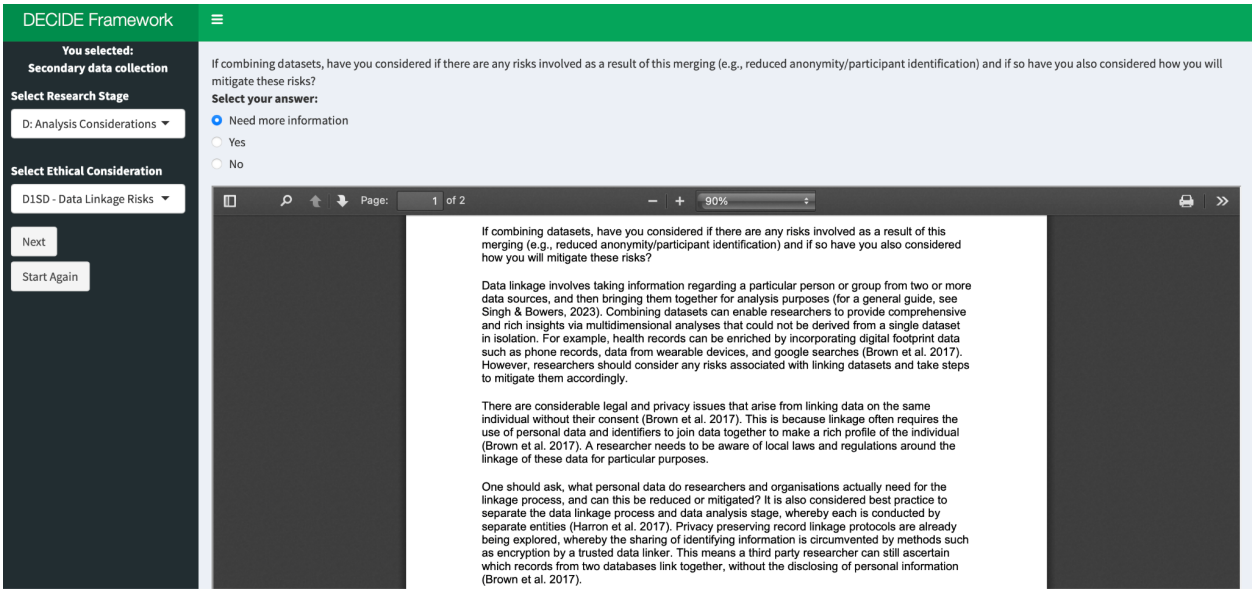

Figure 3: Screenshot of the DECIDE app. A researcher can select a research stage and view relevant ethical considerations. The information provided should allow for reflection and ethical discussions whereby individuals or teams feel satisfied that they have considered each question in the context of their project.

We suggest that when researchers first use the DECIDE *app*, that they review all research stages and questions sequentially by clicking the “next” button. This enables a research team to systematically examine

each question, aiding the write up of an ethically considered research proposal. If a researcher refreshes the page, or revisits later, they can use the drop-down menus to return to the same place and then continue clicking "next" to see the remaining considerations. We suggest that researchers make notes for each consideration, as these can be used when writing a research proposal, pre-registration, or ethics application. Engaging in this process will provide researchers with some confidence that they have proactively identified and addressed ethical issues when using new forms of digital behavioral data.

Once each question has been considered, researchers should record the date when discussions took place using the *flowcharts* provided (https://osf.io/nsgxw/). This creates a transparent record when demonstrating to others (e.g. funders, institutions, colleagues) a commitment to ethics and accountability. The *flowcharts* also help plan when each question will be revisited. Due to the nature of research, and planning fallacies, the *flowcharts* allow researchers to document when these follow-up discussions actually took place. By completing this, a researcher or team is showcasing their willingness to engage with a dynamic ethics process. It flags the research as being ethically vigilant, through proactively addressing any issues which may arise during the research process. Pertinently all the above occurs before the wider dissemination of the research project, shifting ethics from being reactive to proactive.

Developing the DECIDE Framework

The framework was developed by all authors. The team had already engaged in several conversations surrounding the ethics of digital behavioral data, which lead to the co-creation of a literature review, documenting several key debates in the field. This review can be found as part of an earlier version of this paper (Version 1: https://osf.io/c8ert), which documents the numerous publications we consulted. It became apparent that many of the ethical issues outlined in this review could have been mitigated if researchers had

simply asked themselves a set of questions. So, as a team, we began documenting what these questions would be. All six authors met regularly to review and refine these questions, and we further discussed which questions would be worth revisiting at each research stage. Given that our goal was to promote the discussion of each consideration among researchers and teams, we phrased each question to have a simple "Yes" or "No" answer, to indicate whether it had been thought about or discussed. We avoided open ended questions such as "Describe how your project has considered X consideration" as this may imply that a detailed, formal response is required, rather than an informal discussion. The team equally co-created the expansive educational material linked to each consideration, and we built upon the insights and writing generated via our initial literature review. The end-product was a collection of questions paired with resources which can serve as a springboard for ethical discussions at different research stages. Researchers can skip any considerations they deem inapplicable to their research, and therefore, it is not required to verify or enforce that each question has been considered in the DECIDE framework app. Via an online survey, we then collected initial feedback on the framework (see https://osf.io/nsgxw/). Results highlighted its ability to guide ethical reflections and prompt researchers to consider important ethical issues. For example, one participant wrote:

"I like how the DECIDE framework reflects the process through which scientific research is undertaken and how it prompts researchers and their collaborators to engage in discussion and thinking around these issues. It is clear to me that the DECICE framework has been designed by researchers, for researchers - to empower those in our academic community to engage with digital data in a way that is purposeful"

Any reader or researcher wanting to provide further feedback on the DECIDE framework can do so by visiting the OSF page (see https://osf.io/nsgxw/).

Discussion

The DECIDE framework can help researchers evaluate research in a *dynamic* fashion. However, we recognize that any suggestion to have work reviewed, even as part of an ethical review process, has the potential to add 'red tape' and bureaucracy to the research process. Consequently, DECIDE is not meant to replace existing research governance processes, but instead provide questions to guide conversations. These discussions will, in turn, help balance how digital data can address key societal challenges and deepen our theoretical understanding, while mitigating any potential harm; an important debate which should continue to remain at the forefront of our minds today and in the future. Therefore, reviewing DECIDE's considerations are likely to result in better quality and more ethically considered research outputs (Lakens, 2023).

The DECIDE framework can also be utilized by ethics committees as well as researchers. Specifically, it can serve as a tool for identifying potential issues within an ethics application, allowing committees to selectively address relevant considerations to provide feedback to researchers. As these considerations are annotated with examples and guidance, ethics boards can use them to identify and communicate why an issue poses a risk and suggest potential solutions. This approach ensures that feedback is both constructive and actionable - something which in our experience is essential for the smooth operation of ethical review boards.

Our "call to action" is simple. We want to instigate culture change by asking researchers to engage in meaningful ethical discussions throughout a research project. Our aim is to change the perception that ethics is an onerous and bureaucratic obligation that entails cumbersome paperwork and hinders the initiation of

research projects. Instead, ethics is the process of reducing risk by engaging in reflections and group discussions that are sparked by the cumulative knowledge produced by the community.

The DECIDE framework is also a response to existing "calls to actions" made by the research community. Paxton states "*researchers' choices must grow out of personal accountability and a deep culture of scientific ethics, not mere adherence to legal and regulatory structures"* (Paxton, 2024). This is because *"the slow pace of governmental change means that legal and regulatory systems will always be a lagging indicator of permissible behaviours"* (Paxton, 2024). Consequently, the DECIDE framework can support a shift in culture, by kickstarting discussions around emerging topics that are yet to be governed by formal rules and regulations. This can help avoid "ethical blind spots" whereby certain issues may be overlooked if they are not mentioned in existing research governance policies. Notably, "*Researchers have wanted to create a unified legal–ethical framework for online data for over a decade but have been stymied by a complex network of interacting technological, corporate, governmental and individual issues"* (Paxton, 2024). Therefore, we perceive grass route initiatives such as the DECIDE framework to play an important role in mitigating emerging ethical issues which are difficult to regulate. DECIDE is designed and configured to be a dynamic resource that can be transparently amended and expanded to reflect the emergence of ethical conundrums and emerging practice.

The DECIDE framework also provides the means for researchers to adhere to three further calls to action that have been outlined by the research community. These are (i) recognizing the human involvement in data generation even without direct interaction, (ii) documenting and sharing the ethical decision making processes to promote thoughtful practices, and (iii) for researchers to hold themselves to a higher standard than the minimum legal requirements (Paxton, 2024). The DECIDE framework meets these as follows: It encourages researchers to consider the implications of their data collection, analysis, and sharing in projects

which do not involve direct contact with individuals. Discussions prompted by the DECIDE framework can become an integral part of the ethical decision-making process, and these can be logged in the flowcharts provided or documented via other means. Many of the considerations in the DECIDE framework go beyond current legal requirements, so even if a project is technically permissible, it encourages researchers to also consider the moral implications.

Strengths and Limitations

We developed the DECIDE framework with a focus on behaviour data that is created when people interact with technology (e.g. digital interactions). This includes social media activity, app usage, sensor data, and other digital traces. However, the DECIDE framework remains flexible enough to address new and emerging forms of data. Any data that is laden with information about individuals has additional privacy concerns in comparison to data on non-human subjects (e.g. big data sets logging weather patterns). Therefore, it can support the mitigation of ethical issues in AI, Big Data or human-subject projects more generally.

While the framework is designed to provide a robust foundation for ethical decision-making, we acknowledge that it may not align perfectly with all ethical viewpoints, as these can vary widely across cultural and disciplinary contexts. While grounded in existing research, the framework offers opportunities for further empirical validation to enhance its practical application in diverse real-world scenarios. To this end, we have provided a much-needed starting point when engaging researchers in constructive and actionable ethical discussions and reflections. Further, we have provided the launch pad for future developments in this space. Furthermore, as technology and data collection methods continue to evolve, DECIDE may also require updates to remain relevant and effective. However, the DECIDE framework has the flexibility and accompanying platform (the Open Science Framework) to be updated regularly, ensuring it remains relevant and effective over time. We encourage researchers to complement their use of DECIDE

by seeking input from ethical experts, which can help tailor the framework to specific contexts and address any potential limitations effectively.

To conclude, the digital data universe holds tremendous opportunity and potential to advance the scope and depth of our current psychological understanding. However, alongside this progress comes risk—that research can have consequences that are often unforeseen and unrecognized (as illustrated by specific examples reflected upon in the DECIDE Framework information documents). The ubiquity of personal data, the power of computing algorithms, and the novelty of digital paradigms all contribute to uncharted waters when using emerging digital technologies. However, rather than just denying or recoiling from the scale of the challenges ahead, we posit that psychologists can be trained, enabled, and supported to make more ethical decisions. The DECIDE framework serves as a starting point, and it is our intention that psychologists are prepared to engage and lead research that uses new and emerging forms of digital behavioral data.

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