“Everything by oneself”:

psychological and emotional self-care mobile apps

RESEARCH PARTIAL REPORT

The Psychic Economy of Algorithms: rationality, subjectivity and conduct on digital platforms

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Executive Summary

This report brings out the preliminary results of the analysis of ten psychological and emotional self-care mobile apps used in Brazil, in this text named PsyApps. Such applications encompass a wide and heterogeneous range of services and functionalities: from the control of sleep or other emotional and physiological functions to the carrying out of psychological tests and guided therapy, including meditation techniques. The mobile apps were selected from a set of 350 hits obtained with the platform AppAnnie, according to the criteria of relevance and popularity. The analysis of the ten selected PsyApps took two approaches. The first approach involved the applications' most visible layer, more specifically the presentation discourses and the description of the apps themselves and of their functionalities, as stated in the app shops, in their respective websites and social networks. The second approach investigated a more opaque layer, aiming to map out the forms in which user information is collected, used and shared with third parties. We highlight, in the first approach, that a good part of the applications are aimed at an "anxious subject", to whom they offer the means to take care of oneself, especially by means of self-monitoring and self-knowledge. In the apps' discourse and tools, psychic and emotional suffering, as well as the proposed therapy, are strongly centered on the individual. In the second approach, we highlight the lack of transparency and clarity regarding the type of data the applications collect from users, as well as the opaqueness regarding the itinerary of such data both in the sharing with third parties and in its stated aims and uses. From the visualization of the trackers featured in the applications and from the analysis of the terms of use and privacy, we present a few insights about the nature of the data ecosystem and predominant business models.

"We believe in a world where emotional well-being is a simple choice"
(Cíngulo)

1. Research context

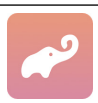
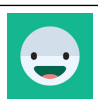
The present report is a partial result of the research titled *The Psychic Economy of Algorithms: rationality, subjectivity and conduct in digital platforms*, coordinated by prof. Fernanda Bruno (CNPq Researcher) and developed by the Medialab.UFRJ team. The project investigates the algorithmic management of psychic and behavioral data in applications, aiming at understanding the rationality model at play, as well as its effects on the subjectivity and on the conduct of its users. The data presented in this report result from an initial effort of mapping applications that invest in mechanisms of capture, analysis and use of psychic, behavioral and emotional data.

Illustration credits: Karolina Koryl

2. Methodology

We mapped the ten PsyApps that ranked among the most popular in Google Play Store Brazil, an application shop, since the cellphone models that use the Android operational system represent 91% of the country's mobile devices. The selected applications were:

Table 1: SELECTED APPLICATIONS FOR ANALYSIS

	ICON	NAME	ORIGIN	LAUNCH DATE	STORE ID
1		**Cíngulo: Terapia Guiada**	Porto Alegre, Brasil	mar. 30, 2017	com.cingulo.app
2		**Controle e Monitor: Ansiedade, Humor e Autoestima**	Pelotas, Brasil	jul. 27, 2018	com.twocatsapp.dailyhumor
3		**PsyTests**	Nova Iorque, Estados Unidos	dec. 29, 2016	ar.com.fennoma.psicotest
4		**Querida Ansiedade**	Goiânia, Brasil	mar. 2, 2017	br.com.app.gpu1622660.
5		**Meditopia: Meditação, Ansiedade**	Istambul, Turquia	mar. 8, 2017	app.meditasyon
6		**Lojong: Meditação e Mindfulness. Reduza ansiedade**	Lisboa, Portugal	nov. 11, 2017	br.com.lojong
7		**Daylio - Diário - Controle de Humor**	Bratislava, Eslováquia	aug. 17, 2015	net.daylio
8		**Monitor de Ansiedade e Humor**	Fortaleza, Brasil	aug. 8, 2017	br.com.delxmobile.ansiedade
9		**Sanvello for Stress, Anxiety & Depression**	Minneapolis, Estados Unidos	jan. 25, 2015	com.pacificalabs.pacifica
10		**Fabulous: Motive-me! Medite, Relaxe, Durma**	Paris, França	nov. 29, 2013	co.thefabulous.app

Because of Google Play Store's limitation regarding the available information on the applications[1], we used the free tool AppAnnie[2], an online analytical data platform geared towards applications and the market of mobile data. We carried out two research lines, making use of AppAnnie's search tool[3]:

1 Google Play Store does not specify the exact number of downloads nor does it separate them by country. Besides, the criteria for the order in which the results of search by keyword appear are also not specified.

2 AppAnnie is used in the application development market for performance follow-up and chiefly for comparison with competitors. The tool records the ranking of the more relevant applications in the app shops as it considers data provided by the shops themselves, the data on application's use and on markets, as well as data on the history of search hits in the app shops and on those more often downloaded in the course of time (Dierter et al, 2019). Available at: <https://www.appannie.com/en/> Access in August 20 2019.

3 All searches were carried out on the 20th of August 2019. AppAnnie features real time updates in their ranking; however, the platform also allows for searching past dates.

1) by categories, which correspond to the same classification featured in the application shops[4]: *lifestyle, medical, health & fitness*;
2) by keywords, as follows: *depression, anxiety, stress, therapy and self-care.* Such keywords were defined by means of a survey of the most frequent words used in the applications' description featured in the search for categories.

We selected the first one hundred search results by category and the first ten results by keyword search, adding up to a total of 350 hits. After the analysis of the results, ten free applications were selected, those meeting the following criteria: **(1) relevance for the research**: applications that mention in their descriptions the means of psychological support and/or evaluation grounded on information-monitoring tools for psychic states, mood and/or emotions; **(2) popularity**: we selected only those that featured in excess of five thousand evaluations[5].

Then, for the selection of the ten applications that comprise our final corpus, we applied the following criteria:

• **Recurrence in searches:** we selected the applications with the greater recurrence[6] in the category and keyword searches, since such applications feature more visibly in Google Play Store, and, in this sense, have a greater chance of being known and picked by users.

• **Popularity in Brazil:** by number of downloads and number of evaluations.

The analysis of the selected ten PsyApps unfolded into two aspects. The first aspect examined the visible layer of the applications' discourse, grounded on the self-description of their aims and methods as presented in the application shop, in their sites and social networks. Although these discourses are not, necessarily, representative of how they actually work, we identified in them the psychological and emotional problems that they propose to solve or alleviate, the tools they claim to employ and the scientific and epistemological models that they advertise to be at the base of their applications - and the results they promise to deliver.

The second aspect considers an invisible layer in the way applications work. We aimed to map out the forms of collection, use and sharing of users' data. In order to do so, we analyzed the privacy policies and the terms of use as we sought explicit references to the forms of data collection, analysis and use; the type of data they collect; whether data is shared with third parties. As a complementary tool, we used the **εxodus**[7] platform, as it makes available and/or generates analytical reports about the trackers[8] featured in each application of the Android system. As we crossed-referenced information from these sources, we sought to observe how much the applications detail the information they gather and infer from their users, the gaps and possible contradictions between what is described in the terms of service and what is actually monitored and collected by the trackers, and, finally, indications and clues about the predominant business models in this application segment.

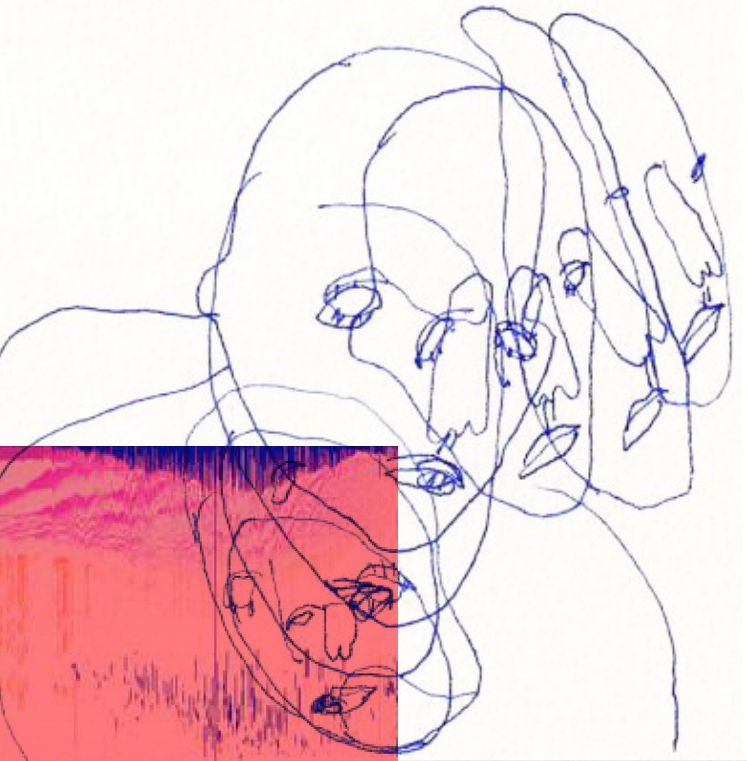
4 In the app shop, each application can be registered in only a single category.

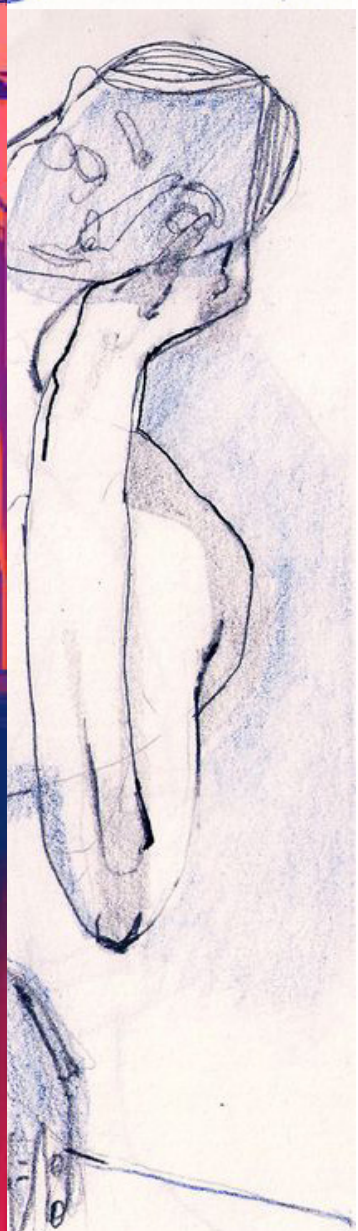
5 The evaluations in the application shops correspond to the section dedicated to the responses to the services by users. In this evaluation, users can leave comments, as well as give a one to five grade regarding the applications' functionality.

6 As each application, in app shops, can only be registered in a single category and, in its turn, AppAnnie's repeated incidence can only be measured with the cross-referencing of the category search with the search by keyword. We therefore selected the ten applications from the average rank of the app in the searches for each keyword.

7 Exodus Privacy is a non-profit organisation led by hacktivists, aiming at "helping people to understand the problems with Android tracking applications". Available at: < https://reports.exodus-privacy.eu.org/en/info/organization/> Access on 8th of April 2020.

8 Trackers are pieces of software dedicated to the collection about you and your use of the application. See more at: <https://reports.exodus-privacy.eu.org/en/info/trackers/> Access on the 15th of December 2019.





Créditos imagens:

3. Highlights

3.1 Problems, Tools, Promises

Analyzing the applications' institutional written matter in Google Play Shop and in their respective sites and social networks, we noticed some recurrences in the terms related to the functions and the purposes of PsyApps. We identified terms that turned up more often and grouped them into the following categories: a) problems that the apps claim to solve; b) the tools offered to do so and c) promises and solutions proposed by the applications, as seen in graphs XYZ. It is worth highlighting that, in the material analyzed, the benefits and offer of states of mind to be reached is often indistinguishable from the tools advertised. Besides, the self-descriptions featured in the applications involve an advertising tone, as what is promised not always corresponds to the offering of specific tools within the app.

PROBLEMS THAT THE APPS CLAIM TO SOLVE

Anxiety 9/10

Stress 5/10

Depression 4/10

Self-esteem 4/10

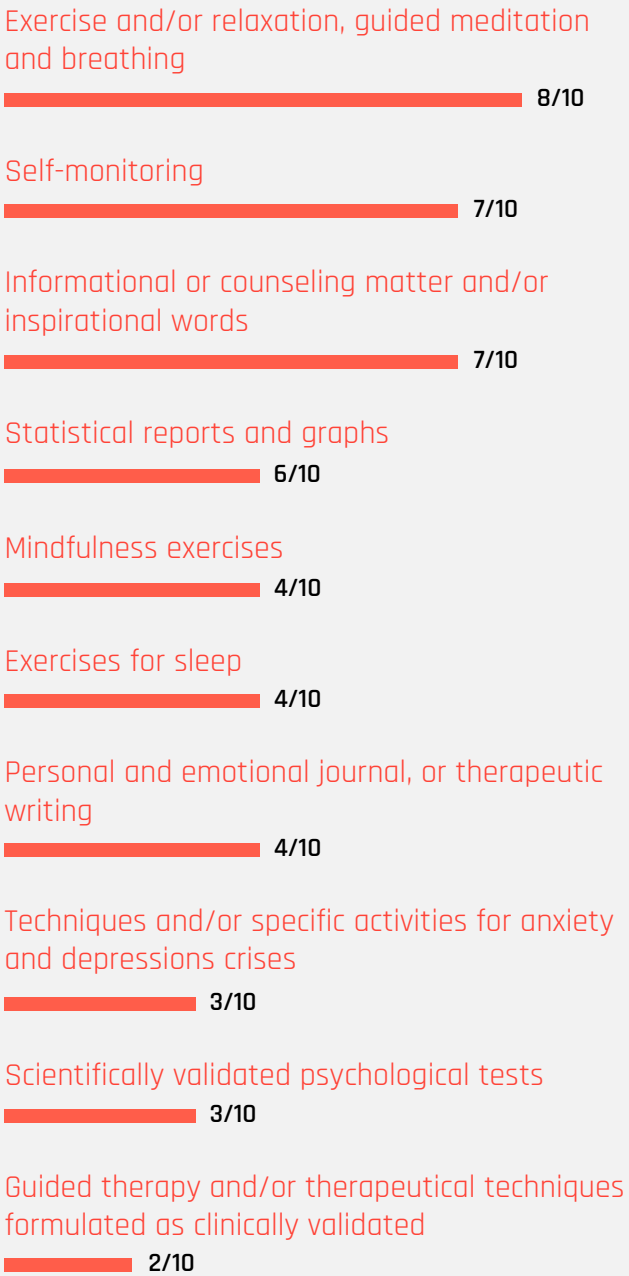
Attention/focus 4/10

Sleep 4/10

Physical/food-related 3/10

Illustration credits: Karolina Koryl

TOOLS AND METHODS OFFERED BY THE APPS



BENEFITS AND SOLUTIONS PROPOSED BY THE APPS

3.2 Psychological and Therapeutic Models

One of the questions posed by this research regards the psychological, emotional, behavioral and therapeutic models featured in the applications. In this partial report, we have taken a first step towards, identifying the references that the applications themselves make to approach theories and scientific and/or clinical techniques. We have thus succeeded in obtaining a few clues about the concept of psychic and emotional health adopted by the analyzed applications. We were also able to indicate a few of the relationships that the PsyApps keep with laboratories and scientific or clinical institutions, as well as how theories and scientific models seek to legitimate the practices and content on offer.

Considering what the applications themselves formulate in Google Play's shop, in their sites and social networks, we find a variety of approaches and methods. Eight in ten applications mention

scientific bases, as six of those make direct reference to specific clinical approaches or scientific methods (*Cíngulo; Meditopia; Lojong; Monitor de Ansiedade e Humor; Sanvello and Fabulous*) and two (*Controle e Monitor; PsyTests*) make general allusions, not detailing much. Plus, five apps (*Cíngulo, Psytests, Querida Ansiedade, Meditopia, Sanvello*) feature the academic background and specialization of their creators.

The therapeutic model found more frequently is **Mindfulness**, featured in 3/10 of the applications, involving therapeutic techniques, programs and attention directing exercises. The app Lojong makes reference to the **Cultivating Emotional Balance (CEB)** program, while Meditopia is based on the **Mindfulness-based stress reduction (MBSR)**. Among the applications, Sanvello and Lojong are the ones that invest the most in scientific discourse, featuring a page in their site to publicize contents involving scientific research related to their therapeutics. Besides these models, the **Cognitive-behavioral therapy (CCT)** and **Behavioral Economy** are also cited.

3.3 Psychic and Emotional Data

Despite that fact that, by their very aim, the analyzed applications offer forms of recording, analyzing and monitoring information on users' emotions, mood and psychological states, the collection and sharing of this kind of data is not made explicit in the terms of use and in privacy policies, as can be seen on Table 2. Among the analyzed documents, only Sanvello's Privacy Policy explicitly refers to the collecting of data on "mood, aims and personal health data". Notwithstanding, it is possible to detect indications of such collecting and sharing by means of other tools, as we demonstrate below.

Table 2: SYNTHESIS OF DATA REGARDING THE COLLECTION, SHARING AND USE OF INFORMATION AS FOUND IN THE TERMS OF USE AND PRIVACY POLICIES

Mentions data sharing with third parties	**10/10**
Mentions identifiable data and/or personal information collection	**08/10**
Mentions general information or activity data collection	**09/10**
Specifies which pieces of information can be shared with third parties*	**02/10**
Specifies who are the third parties with whom data is to be shared	**04/10**
Explicitly states that no data is collected**	**01/10**
Mentions data sharing for academic-scientific research	**03/10**
Mentions use of data for advertising tools automation and/or personalized marketing	**07/10**
Claims that they submit data to de-identification processes (individually or in aggregate form)	**02/10**
Explicit mentions emotional or psychological data collection	**01/10**

* Even the apps that do declare that user data can be shared with third parties (Cíngulo and Daylio), this is not clearly stated.

** This is the Lojong application. Notwithstanding, as verified by our analysis, the app makes use of trackers that collect and analyse data.

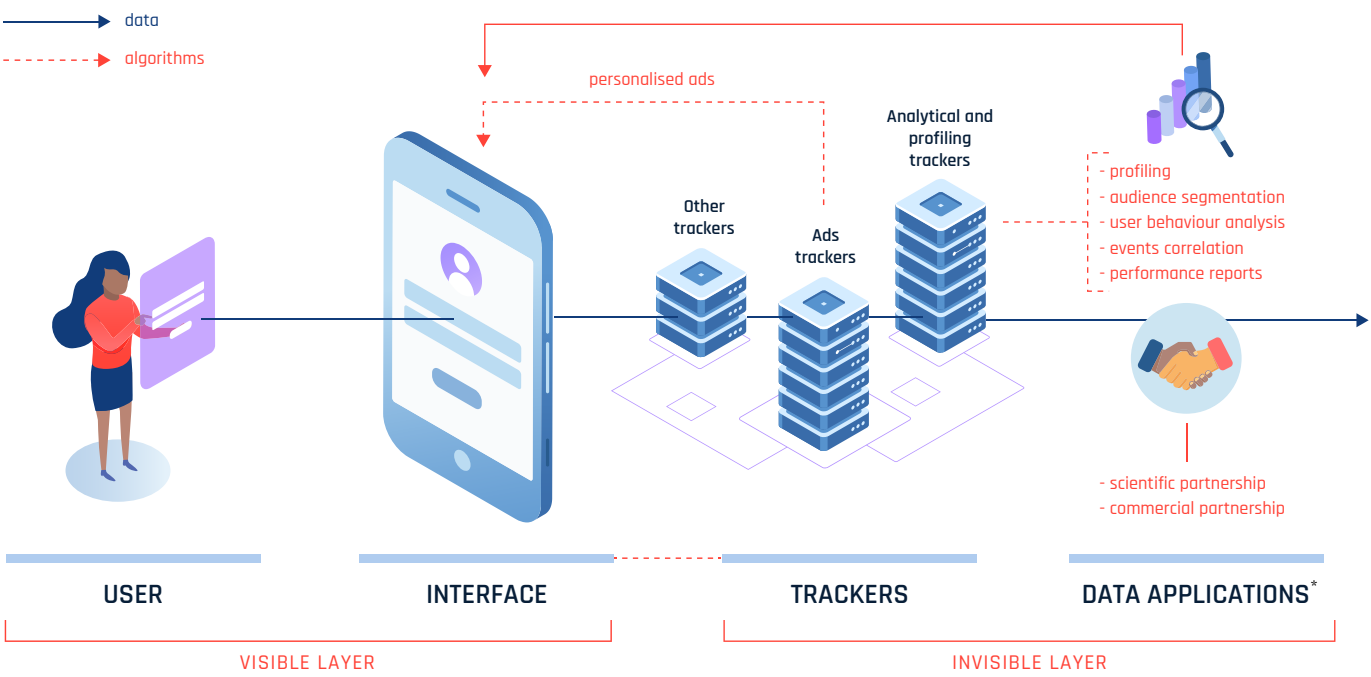
3.4 Trackers

In order to infer the **non-declared collection and sharing of data** by the PsyApps, we analyzed the presence of tools used in the applications market for the tracking of user activity and optimization of performance, the so-called trackers . In order to detect the presence of such **trackers**, we used **exodus**, a "privacy auditing platform for Android applications". It identifies trackers by monitoring the application's installation files (Android Application Pack - APK).

Two sets of trackers emerged, both in the analysis of the terms of use or of privacy policies and in the monitoring operated by means of **exodus**: the analytical and profiling trackers , and the advert trackers, corresponding to 44% and 33,3% respectively, of the total of trackers surveyed (75 trackers). Such feature renders evident two fundamental dimensions of the "data economy" on which not only the analyzed applications are based, but also a great part of value production in the digital economy.

In Infographic 1, we succinctly illustrate the fluxes of capture, sharing and use of knowledge extracted from the data by means of trackers, as well as the cyclic character of this process.

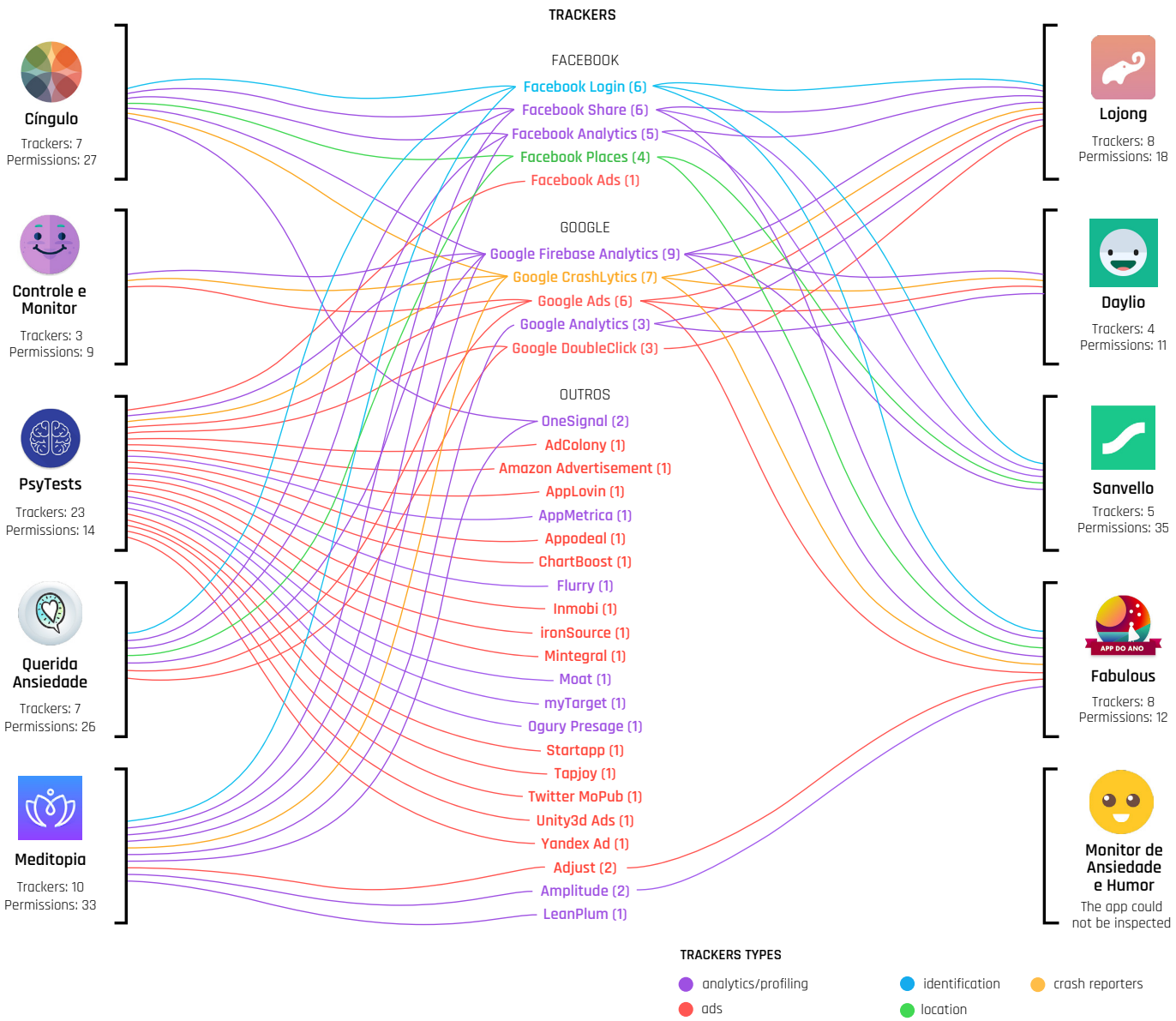
Infographic 1: FLUX OF CAPTURE, SHARING AND USE OF DATA BY MEANS OF TRACKERS



*uses of the knowledge extracted from data

In their turn, the number and types of trackers featured in each application can be visualized in Infographic 2. Besides the recurrent categories, the massive presence of Facebook and Google in this market of capture, sharing and data analysis is visible. On inspection of nine applications, trackers belonging to Facebook were detected 22 times and Google's 28 times, corresponding, together, to 66% of the total of trackers used. In the following infographic, one can see in more detail the trackers and permissions of each application, as well as recurrence of each tracker.

Infographic 2: TRACKERS BY APPLICATION DETECTED BY THE EXODUS TOOL



3.4 Business Models

Smartphone applications can feature different business models regarding the way in which they generate income. Generally, a good part of the applications market is inspired by the games market's business models. The business models can be easily identified in Google Play Store (including single payment, free of charge with adverts, free of charge with purchase or paid with purchase). Every application needs to inform, before it is downloaded by the user, whether or not there will be a charge for installation, whether adverts are displayed and if there are purchases within the application. Based on Infographic 2, the analysis of the presence of trackers allows for the inference of additional information about the business models at play.

4. Reflections

4.1 “Everything by oneself”

A dominant feature of the PsyApps is the focus on self-monitoring, self-knowledge and self-care. The psychic and emotional well-being promoted by these apps is centered on the individual. As stressed by the *Cíngulo* application: “Everything by oneself”. Mental health, historically harnessed to relational therapeutic practices and issues that go beyond the individual (family, culture, society etc), is understood as a question of will, investment and personal dedication. Everything by oneself, but with the help of the app. In other words, the application and its supposed “technical neutrality” advertises itself as the perfect device for each person to monitor, know and take care of oneself. After all, it is a “machine” that feeds on “our own selves” (habits, practices and information we provide) and that “devolves” us an image, a graph, a visualization of our mood, our routine, our level of anxiety, our nights, our insomnia etc.

However, there is no such thing as technical neutrality, and the user is not really by herself in this self-knowledge journey. Both the problems aimed at by the apps and the methods or solutions proposed are the result of a series of perspectives on psychism, behavior and emotions, as well as on its dysfunctions and “improvements”. Likewise, the types of data generated by users are analyzed by a series of other humans and machines, and is eventually shared with third parties. The advertised self-knowledge is, therefore, accompanied by a chain of human and non-human actors, institutions, corporations etc.

There is a series of relatively invisible mediators acting in this offer of self-knowledge and self-care. Between the wearable self-monitoring “gadget”, the coach, the therapist, the self-care

Illustration credits: Moonassi e Karoline Koryl

book and the meditation manual, the psychological and emotional self-care applications feature, further, a very complex network of influences and sociocultural, scientific, economic matrices. No less complex is the network of meanings, appropriations and effects of this recent modality of self-care. The analysis of such networks is the investigative horizon of "The Psychic Economy of Algorithms" research, but, in this partial report, we have limited ourselves to briefly sketch out some clues for later evaluation and reflection.

A brief and panoramic overview of the PsyApps' enunciations identified the influence of positive psychology and its coaching techniques; of patient-centered clinical approaches; of neoliberal individualizing rationale of psychic well-being and emotional production processes; of the cross between personal growth and entrepreneurialism, also particular to neoliberalism; of the automation of practices and of services of all kinds, including those geared towards the promotion of health; of surveillance capitalism and its growing plethora of technologies geared towards the capture of behavioral data; of the algorithms' psychic economy and of their investments in automated mechanisms of collection and use of psychic and emotional data for the prediction and control of conducts.

Working under a logic of a neoliberal and enterprising rationale, the apps reinforce practices of self-control and self-surveillance, sold as a fundamental ingredient in order to achieve the promised states of mind. In this sense, the apps reinforce individual investment and responsibility as the therapeutic path to take as one tackles psychic and emotional problems not considering collective, sociocultural and contextual factors implied in individual suffering.

4.2 The "anxious subject" market and time management

"Anxiety", defined as a "exaggerated preoccupation with what is yet to come" (*Querida Ansiedade*), configures the main problem aimed at by the analyzed apps . The emphasis on anxiety echoes the WHO report showing that Brazil leads the world in the number of anxiety cases, present in 9,3% of its population. In a context of 24/7 temporality (Crary, 2014) and of an indebted subjectivity (Deleuze 1992, Lazzarato 2017, Brown 2015), anxiety becomes simultaneously the main effect of contemporary rhythms and practices as well as the main problem to be solved. However, the applications rarely link states of anxiety to social, political and economic contexts. Anxiety is presented according to a biological and/or as a state of psychic and emotional imbalance circumscribed to the personal universe. "*The best form of learning to deal with anxiety is to know oneself. And respect oneself*", states *Querida Ansiedade* app. Together with the other time control and management applications, the PsyApps comprise an "anxious subject" market that seeks quick and individualized solutions to tackle anxiety and its negative effects on work, on relationships and on mental health. Besides, such apps seem to presuppose that we are bad managers and bad monitors of our own behaviors and inner states (Purser, 2019), as they claim that we need their tools for an efficient and optimized self-management of physical and mental health.

4.3 Applications, psychotherapy or laboratory?

As we saw, 80% of the analyzed apps make reference both to approaches and scientific foundations of the functionalities, tests, exercises and services they offer. Such emphasis makes clear how much the supposed scientific nature is an important ingredient to legitimate the tools offered by the PsyApps[9]. At the same time, there is, in some of them, the concern of making clear that they are not offering a conventional clinical or psycho-therapeutic service, but instead support for self-knowledge and emotional and psychological self-care. *Cíngulo* is exemplary in this sense. In Google Play Store, in its site and social networks, it presents itself as a "guided therapy" application and makes emphatic references to the scientific foundations of its contents and techniques. But, in its privacy policy, Cíngulo warns that it does not do psychotherapy. In its site, we find: "*A proven result. Created by PhDs in neurosciences, the app is based on scientific research and clinical practice. [..] You begin to notice improvement already within a few minutes of use. Our surveys indicate that with around two months using Cíngulo, the levels of anxiety fall by half and force of will doubles*". If this statement leaves margin to take the app as a psycho-therapeutic service, the privacy policy – that is rarely read with attention, but is central in the delimitation of juridical responsibility – clarifies: "*Cíngulo is a site/application of online self-therapy and self-care. The platform presented in the Site/Application is not psychotherapy, because there is no treatment carried out face-to-face with a psychotherapist*".

Another ambiguity present in the emphasis given to the scientific foundations concerns the imprecision regarding the use of data collected by applications for purposes of scientific, academic or clinical research. It is equally unclear if and how such data and the knowledge gleaned off them feed other applications. We know that the amount and quality of the information collected for such apps allow for the building of databases, of correlations and valuable knowledge about the behaviors, habits, emotions, psychic states and vulnerabilities that can be used to influence conducts and practices in countless fields (mental health, consumption, electoral marketing, entertainment etc.). In other words, if on the one hand the science grounding the tools offered by the applications is touted (in most cases with little rigor), on the other little is spoken of the science and the research derived from these very apps, the data collected and of the behavior monitored. Little is said, therefore, that such PsyApps are also a singular kind of psychological, behavioral and emotional laboratory, whose economic potential is clear, while their effects and uses remain undefined. Understanding these effects and uses is fundamental to evaluate the potentialities and traps of the new intersections between automation with self-care.

9 The data is consistent with a recently published research in Nature. Cf. Larsen, et all., 2019. Using science to sell apps: Evaluation of mental health app store quality claims. npj Digital Medicine. doi:10.1038/s41746-019-0093-1

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