

Adolescence in a fast-transitioning world: Tentative policies as regards the harmful use of substances

A adolescência em um mundo em transição acelerada: políticas do provisório quanto ao uso prejudicial de substâncias

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ABSTRACT This article summarizes data and information about the transformations in adolescence/youth in the contemporary context and their association with the use and abuse of psychoactive substances. Given the profound reformulation of markets and habits related to legal and illegal substances, often combined, it is necessary to rethink the frameworks for regulation, prevention, and treatment. Although traditional markets and habits, both legal (e.g., alcohol, and tobacco) and illegal (with the predominance of cocaine and cannabis derivatives), prevail in the Brazilian context, it is necessary to probe new markets and patterns of use. Rapid and profound transformations should not lead to fear, indifference, or inertia. Contemporary science and society have the tools to deal with these challenges. Setting aside the absolute relativization of concepts and policies, as well as assertiveness without a conceptual or empirical basis, it is necessary to advance ‘tentative policies’. Provisional does not mean an absence of criteria or frameworks, but rather their renewal. It is necessary to combine: bounded rationality; concepts and methods of ‘Decision-making in contexts of uncertainty’, and citizen science. Under this guidance, it is possible to deal with challenges in a renewed and successful way in this and other fields of science and social life.

KEYWORDS Substance abuse. Adolescent. Social networking. Citizen science. Decision making.

RESUMO O artigo sumariza dados e informações acerca das transformações na adolescência/juventude no contexto contemporâneo e sua associação com o uso e abuso de substâncias psicoativas. Diante da profunda reformulação de mercados e hábitos referentes a substâncias lícitas e ilícitas, frequentemente combinadas, cabe repensar os marcos de regulação, prevenção e tratamento. Embora mercados e hábitos tradicionais, lícitos (como álcool e tabaco) ou ilícitos (com o predomínio da coca/cocaína e derivados da cannabis) prevaleçam no contexto brasileiro, cabe prospectar novos mercados e modalidades de uso. Transformações rápidas e profundas não devem conduzir ao medo, indiferença ou inércia. A ciência e a sociedade contemporâneas contam com ferramentas para lidar com esses desafios. Deixando de lado a relativização absoluta de conceitos e políticas, assim como a assertividade sem base conceitual ou empírica, cabe formular ‘políticas do provisório’. O fato de serem necessariamente provisórias não significa ausência de critérios ou marcos, mas sim sua renovação. Cabe adotar: uma racionalidade balizada por limites (bounded rationality); conceitos e métodos da ‘Tomada de decisões em contextos de incerteza’ e da ciência cidadã. Com isso, é possível lidar com os desafios de forma renovada e bem-sucedida nesse e em diversos campos da ciência e da vida em sociedade.

PALAVRAS-CHAVE Abuso de substâncias. Adolescente. Rede social. Ciência cidadã. Tomada de decisão.

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Introduction

Currently, global societies are experiencing a rapid, profound transformation in values, and benchmarks across geopolitical, economic, societal, cultural, and behavioral domains.

While a retrospect documents pivotal transitions like the Industrial Revolution or Feudalism's progressive decline, the current transition seems unprecedented. It uniquely combines transformations of individuals, their social groups, and societies in a broader (to some extent, global) sense, with transformations in the sphere of information and connectivity through networks of previously unimaginable scope and, more recently, transformations dictated by the accelerated evolution of artificial intelligence. This study will not make a comprehensive analysis of these developments, as found in seminal works such as 'The Square and the Tower'¹ and, more recently, 'Nexus'².

This article examines the evolving interplay between two dynamic life aspects, currently particularly fluid niches within a society undergoing overall accelerated transition. These are adolescence and youth, and the use of psychoactives. These issues intersect deeply, albeit by no means exclusively so, as shown by classic works on substance use from a diachronic perspective spanning decades^{3,4}.

Young people are usually curious and frequently experiment with new sensations and experiences in several fields, such as sexuality and the modulation of consciousness and perception. The latter are associated with diverse events, with complex interrelationships – for example, in experiences of psychoactive substance use and real or hypothetical transformations of social structures and values, as in the Santo Daime user communities⁵ – as well as the search for new experiences through the most diverse means. These range from religious experiences, engagement in social causes and political movements to the use of substances that modulate perception and thought, as classically explored by authors

such as Charles Baudelaire⁶, who coined the poetic, albeit partial expression of 'Artificial Paradises'. Baudelaire's conception contrasts with that of another author, of German origin but French expression, Claude Olievenstein, in a now classic work⁷, who equates artificial paradises with the brief 'honeymoon' between the compulsive user and psychoactives.

Furthermore, the concept of 'The Doors of Perception', by English novelist and essayist Aldous Huxley⁸, also bears little relation to the current experiences of psychoactive substance use. Although the use of psychoactives resonates with the concepts of Baudelaire and Huxley, the current outlook is much less associated with a possible expansion of experiences and artificial paradises than with a dystopian setting that complexly combines pleasure and distress, the search for peace, sometimes of a spiritual and even beatific nature, and the risk of death.

Somewhat surprisingly, one of the first authors to clearly establish the distinction between centripetal and centrifugal, synchronic and diachronic uses of psychoactives was Brazilian poet and essayist Paulo Leminski, in a short essay that is now little remembered, but no less precise, and, from a certain perspective, prophetic⁹.

This article is divided into three sections besides the Introduction. These sections are: i) some aspects of adolescence and youth; ii) transitions in the circulation and use of psychoactives; and iii) policy formulation and implementation. The latter are called 'policies of the provisional' because they aim to address fleeting realities as realistically as possible.

Observers and analysts of today's world find it clear that predicting, with a reasonable margin of certainty, the future of this transition is challenging. Any attempt to offer a certain outcome risks being proven false. Yet, it is possible to develop relatively robust scenarios and distinguish between more or less well-founded and more or less consistent predictions, and this is debated by Tetlock and Gardner¹⁰.

Adolescence and youth: brief observations on experiences in the digital age

In March 2025, the British miniseries ‘Adolescence’ (created by Jack Thorne and Stephen Graham and directed by Philip Barantini) was released on the Netflix® platform. This analysis will not be undertaken here, as such analyses have been exhaustively repeated from various angles in Brazil, where dozens of analyses and commentaries are available online, as well as in 70 other countries on websites dedicated to streaming television series¹¹.

What stands out, more than the content and issues raised by the series, is that these themes have been addressed in recent academic literature, but have reached the public as a ‘new’ reality that has apparently surprised millions of viewers (especially parents and educators, according to various comments, in Brazil and in many different countries).

The massive influence of the internet is not new. However, most discussions focus on how it erodes democracies and social justice policies^{2,12,13}. Perhaps this is because the erosion of democracies is one of today’s most distressing events¹⁴. Less attention is given to the internet’s impact society’s different segments or the social fabric in a broad sense. Online platforms and instant messaging apps now strongly shape or deform young people’s identities. They exert influence far beyond the classic triad: parents and family, schools, and peer interactions. The series has sparked debate about failed family education strategies, school deterioration – especially, English schools, and more pronounced in Brazil¹⁵ – and the spread of an avalanche of fake news and shallow slogans that foster hatred, misogyny, racism, and more.

Zuin¹⁶ looks at how fascism has reemerged in Italy, both in Mussolini’s time and now, led by several groups that are gaining increasing

strength, such as Lega and CasaPound, based on a set of strategies and concepts summarized here:

- i. Abusive use of the first-person singular personal pronoun – the basis for the emergence and entronement of populist and charismatic leaders;
- ii. The use of the plural ‘we’ as opposed to ‘them’, whether these ‘them’ are ethnic minorities, gender minorities, or similar. A theme explored by the aforementioned miniseries regarding a chauvinistic and violent gender ideology;
- iii. Short and imperative phrases, that is, a combination of new or revamped slogans, memes, and the replacement of dialogue with imposing assertions and calls to integrate and replicate, uncritically, groups, movements, and demonstrations (strategies underlying the expression that some content ‘goes viral’);
- iv. The appeal to citizens (in the case of macropolitics) or subgroups (such as members of a ‘clique,’ in the technical sense of a sub-area of a particular social network¹⁷), to position themselves in opposition to democratic values and respect for human rights.

The influence on the (de)formation of citizens is especially significant, according to several surveys (see the successive opinion polls regularly analyzed by Andrew Gelman on his technical blog, which is worth reading even by non-specialists¹⁸), particularly among younger less-educated men and those struggling to enter the job market.

A huge number of voters supporting these political platforms, however, far exceeds these traditional categories. This shows two things: this dynamic undoubtedly has micro and mesosocial dimensions, particularly affecting certain segments, but also a macrosocial dimension, insofar as such formulations can become majority views and elect/perpetuate

fascist-leaning parties and leaders in power in several countries (which is already happening).

Obviously, among adolescents and young people, in whom the central nervous system is maturing¹⁹ and intense and extensive bodily transformation, psychic shifts and the formation of a framework of values, attitudes and, eventually, habits (including the consumption of psychoactives, beyond experimentation) are taking shape. As a result, online influence is more pronounced, diffuse, and spreads more quickly in this group. A new characteristic of social networks, based on the internet, is their dual capacity to promote risky behaviors, as well as to become, themselves, the basis, means, and instruments of compulsive behaviors of continuous and even dependent use²⁰.

In a way that was unprecedented until then, a set of online platforms is simultaneously capable of creating habits of compulsive use per se (whose withdrawal syndromes are now commonly known as ‘nomophobia’²¹), a marketing tool for various products, including psychoactives²², and a platform for disseminating behaviors that, although not directly addressing substance use, promote, in a mediated way, its use, as defining elements of an aggressive masculinity, of a deliberate and proactive differentiation of subgroups from the mainstream of society (which they repudiate and from which they want to distance themselves), and of the stigmatization of minorities who abstain from using some of these substances (such as traditional Muslim communities living in Western contexts, where alcohol is a socially accepted substance).

The new and still little-known market for legal and illegal substances

We should consider the issue from a complementary perspective: adolescents and young adults interact with a market for psychoactives that differs profoundly from the one that

has guided decades of preventive, treatment, and harm reduction approaches. For didactic purposes, this market can be divided into three axes, although these largely combine in a complex and still poorly understood way.

According to the United Nations Office on Drugs and Crime (UNODC) website, more than 400 new substances enter the market each year – a combination that is difficult to define, encompassing what could be termed ‘New Substances’ and major or minor modifications to substances already in use. The umbrella term ‘New Psychoactives’ (NPS) applies to all of them²³. Broadly speaking, this rather heterogeneous set can be subdivided into three main categories:

1. Substances originally obtained from raw plants, which, due to supply pressures, new geopolitics, or changes in laws and regulations, become disconnected from their original sources and give rise to new products, partially or entirely synthetic. This is the case, among many others, of synthetic cannabinoids, which, with the legalization of raw cannabis, entered markets in countries, especially those with higher incomes, as a much more potent product, and not regulated by existing laws and regulations²⁴. Without claiming to be exhaustive, which is impossible in a particularly dynamic context, we should mention cathinones, which, although related to the age-old use of Khat, especially in certain regions of Africa and the Middle East, differ from it in terms of potency and their hitherto unusual profile of synthesis, no longer based on the plant, but rather on bath salts²⁵.

2. Substances that belong to the therapeutic arsenal (in some cases, suppressed from it for decades, as in the case of nitazenes²⁶), or are commonly used in specific medical fields (such as anesthesiology or palliative care), but until now absent from the non-therapeutic market, such as fentanyl²⁷. Although there are differences regarding

the nature of the industries, such as those of alcohol and tobacco, i.e., products without therapeutic use, it is necessary to note, to some extent, the reconfiguration of the respective markets. In the case of alcohol, with restrictions in several countries on the advertising and unregulated marketing of traditional beverages (for example, distilled spirits like cachaça and fermented beverages like beer), new combinations are emerging, whose marketing is explicitly directed at young people or women, according to the marketing strategies of the companies themselves, such as the so-called ‘alcohol pops’ or ‘alcopops’ (there is, for now, no consensus on how to name this class of beverages in Portuguese), which combine traditional sugary drinks, such as sodas, and potent distilled spirits, such as vodka²⁸. Similarly, given the decline observed in several countries, including Brazil, of traditional tobacco cigarettes, there is a consolidation of smoking through vaporization or ‘vaping’ and the constant renewal of what has become known as Electronic Smoking Devices (ESDs)²⁹.

3. Thirdly, we should mention new compounded substances, which are mixed imprecisely, since their combination is done ad hoc and with the explicit purpose of evading detection by forensic chemistry and the authorities in charge of controlling the supply. This deliberate manipulation makes it extremely difficult to act on the supply, as there are doubts as to what to control/prohibit. A typical example of this third class is Tusi or pink cocaine, which, to the surprise of many, has no necessary relation (sometimes none at all) with cocaine as we have known it for decades (i.e., a derivative of the *Erythroxylum coca* plant). Pink cocaine/Tusi is an undefinable combination of various products, such as the anesthetic Ketamine, MDMA, fentanyl (or another potent opioid, xylazine) and, possibly, so-called classic cocaine.

Beyond perplexity: the politics of the provisional

There is no doubt that very rapid and intense transformations generate a climate of perplexity, often combined with panic and inaction. The numerous bewilderments, controversies, and impasses that marked the initiatives related to the last two pandemics, HIV/AIDS and COVID-19, are widely known, and it is not appropriate here to repeat hundreds of analyses published both in academic literature and in the press and other traditional media, such as television, and, perhaps more intensely, on social media in general.

However, we should attempt to outline what we could call policies of the provisional, based on the increasingly robust and diversified field, initially formulated by Amos Tversky and Daniel Kahneman, of what has become known as ‘Decision-Making under Uncertainty’³¹. This field of knowledge now unfolds in hundreds of articles and books, with one aspect that can be defined as strongly mathematized and a complementary version, of a more qualitative matrix and anchored in classical policy analysis¹⁰.

It is impossible to conclude this article with definitive conclusions and recommendations. They would be inappropriate in a dynamic, ever-changing, and largely unpredictable context. However, decades of studies on policy formulation and decision-making under uncertainty allow us to adopt a bounded rationality, replacing an absolute and usually sterile relativism. Let us consider some provisional ideas, which, in any case, are more useful and ethical than stigmatization or indifference:

- We should continuously monitor trends, whether they relate to the viewpoints, attitudes, and behaviors of individuals or social groups and national societies and supranational blocs (for example, the European Union). The position of the researcher and policymaker should be as free as possible from biases, preconceived ideas, and absolute assertions.

- We should understand that sciences that are now considered classic, such as the several branches of Collective Health and the Social Sciences in their consolidated form, must be complemented by what Mathew Salganik, a sociologist of a new generation, called in a book that is now a worldwide reference, ‘Social Research in the Digital Age’³².
- This effort implies reconciling methods, techniques, and also sources. Beyond the so-called ‘Gutenberg Galaxy’, that is, the classical literate culture prevalent since the 16th century, internet-based social networks are here to stay, whether we like them or not, whether we are in tune with them or not. The fact is that a growing number of people, especially young people, extract their primary information from these networks.
- We should try to regulate these new media (a task that is far from simple and constitutes a global challenge) to prevent (or at least reduce) the spread of hate speech, discrimination against people with any disabilities and other minorities, among many other challenges. Creating websites certified by institutions and professionals with real knowledge of what they are talking about is crucial. The Oswaldo Cruz Foundation and the Brazilian Ministry of Health have invested in this direction. This is no simple task in the face of a veritable avalanche of fake news, but it is something that should always be attempted.
- We should engage in permanent monitoring, at a different hierarchical level of aggregation, beyond the complexity of individuals and social groups, namely, that of the substances themselves, in their chemical dimension, initially via analytical chemistry and, eventually, forensic chemistry. Obviously, it is impossible to formulate any policies regarding something that is completely unknown. Although this dimension does not exclude the dimensions of the human psyche and social configurations, it is indispensable, and has been successfully conducted in Brazil³³, albeit on an insufficient scale given the complexity of the markets, in an extremely diverse, heterogeneous and very extensive country.
- We should integrate these issues into the training of new professionals, not as an exotic or fortuitous topic, but as a central theme, since it permeates their lives, both as professionals and as young individuals. Initiatives in this direction have been timid, if not absent, frequently paralyzed by fierce ideological debate, misinformation, or even disinterest. A generational challenge is also at stake: motivating teachers, belonging to other generations, to interact with younger students with diverse backgrounds and motivations. Very little will be achieved if this training/capacity building is limited to a restricted contingent of specialists, since most people will interact, should they need guidance, treatment, or support, with necessarily universal and generalist systems, such as the Unified Health System, the Unified Social Assistance System, and the set of universities and technical schools. Obviously, thinking about universal public systems is incompatible with broad specialization in the strict sense, although such systems should always include a fraction of specialists, which, even in the universal care, training, and social support systems of the most affluent countries, is always small compared to a large group of generalists who work at the basic or primary levels of care, training, and social support.
- We should develop harm reduction and prevention programs, designed in new formats, since even the most up-to-date analyses of harm reduction actions, such as in Szalavitz’s book³⁴, constitute historical assessments of what has occurred over decades, but not works aimed at forecasting.

– Similarly, proven effective prevention initiatives, such as those systematized on the UNODC website³⁵, are quite useful in addressing ways of acting not directed at substance A or B, but rather focused on difficult but necessary intergenerational communication, and on the development of social interactions based on altruism and respect for human rights. In any case, such initiatives were evaluated in contexts that are now undergoing rapid transformation, and should be subject to constant reassessments and reformulations.

– Finally, it is appropriate to apply to this field of study and action concepts originating from citizen science, now established in various fields, such as chemistry, in which it was awarded the Nobel Prize in 2024.

There is not yet a universal concept of citizen science, but it is distinct from what has been conventionally termed action research. The territorial dimension of exploration of action research, at least the classic kind, is coupled with intervention, agreed upon with the respective communities. Contemporary citizen science can take on this local and contextual aspect, as in recent work, in which experts and dog owners contrast and compare

their experiences with the manipulation by dogs of audiovisual literacy resources³⁶.

However, we must also consider the aspect crowned by the 2024 Nobel Prize in Chemistry, in which a vast number of experts and citizens without any training or background in chemistry acted, in a distributed and independent manner, in the cooperative elucidation of a historical challenge in protein chemistry, which concerns the ways in which proteins fold and conform in space (see initial formulation in Salganik³² and brief summary of findings on the Nobel Prize website).

Clearly, the field of adolescents' attitudes, behaviors, and representations on diverse topics, and especially sensitive topics such as substance use and abuse, is far more complex and challenging than observing dogs or bending proteins. However, it suffices to remember that, in classic chemistry textbooks from not so long ago, the comprehensive elucidation of the spatial conformation of proteins was defined as an impossible task.

Authorship contributions

Bastos FI (0000-0001-5970-8896)* is responsible for the preparation of the manuscript. ■

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