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Analyzing suicide life stories on Wikipedia with Highway_star and other textual visualization tools

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Abstract

Being responsible for a death every 40s, suicide is a major public health concern (Brunier et al. 2019). Even if many of its risk factors are social (Van Orden et al. 2010), there are surprisingly few qualitative sociological studies about the phenomenon. This study aim is to provide a life-story sociological analysis of suicidal trajectories. Two challenges are identified: gathering suicidal narrative and maintaining a quantitative foreground in order to deepen and rationalize the interpretation of data. They are both faced using a self-made, free to use, open access, algorithm: Highway_star (https://github.com/matheo-daly/highway_star). Two corpora of Wikipedia biographies of people who died by suicide in the 1920s (N = 82) and 2020s (N = 49) are gathered. Following an application of Fritze Schütze's methodology (Schütze, 2014), classical textual visualizations are produced. A Hierarchical Descending Classification, a Factorial Correspondence Analysis and a Similarity Analysis reveal five narration categories centered around different topics: cinema, death, family, poetry and politics. As none of those visualizations focuses on the developmental aspect of the biography, they offer limited interest for a life-story investigation. The second functionality of the Highway_star tool, which represents a narrative's unfolding with a Sankey Diagram, allows completing the analysis. It shows interesting differences between decades or gender. An example of the last being that men narratives tend to be more complex and achievement focused, while the women ones are more linear and family centered. The study's range has limitations. A major one is related to the corpus and the inability to identify clearly which parts of the narratives are associated to fame and which to suicide. Another one is linked to the Highway_star tool that sometimes lack of flexibility.

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Introduction

With a worldwide average rate of 9 deaths per 100,000 individuals per year in 2019 (World Health Organization 2021), representing a lethal event every 40s (Brunier et al. 2019), suicide is a major public health issue. It is closer to accidental deaths than sickness or natural ones (Gray et al. 2014) making of the understanding of its social causes an important part of the prevention strategies. The beginning of the twentieth century is characterized by a considerable sociological (Halbwachs et al. 2002; Durkheim 2013) and psychological (Achille-Delmas 1932) interest for the phenomenon. It progressively loses its intensity, for the benefit of epidemiological and medical studies (Van Orden et al. 2010; Klonsky and May 2015; O'Connor and Kirtley 2018). At the end of the twentieth century and beginning of the 21st, sociological suicide studies are scarce and tend to be quantitative (Baudelot and Establet 1984, 2011, 2018).

The last major qualitative sociological studies about suicide date of the 1970s (Baechler 2009). It is postulated that the disinterestedness for the last is linked with a lack of quantitative foundations that would allow them to be mobilized for preventive measures. Two points can be considered as invitations to reconsider this qualitative disengagement. Firstly, since the 1980s, the life-story method has been theorized as a way to comprehensively assess the pathway followed by an individual toward a specific social phenomenon (Bertaux and Bertaux-Wiame 1980a, b; Linde 1993; Schütze 2014). Secondly, the growing entanglement of social sciences and informatics have led to the creation of textual visualization tools that allows rationalizing qualitative studies (Ratinaud and Marchand 2010). Overall, it seems possible to qualitatively study suicide, using the life-story methodology, while relying on a quantitative ground in order to remain consistent with epidemiological and medical studies of suicide.

Two difficulties arise. Firstly, people who kill themselves are dead. Gathering their testimonies is not possible. Secondly, classical textual visualization tools such as the Hierarchical Descending Classification (HDC), the Factorial Correspondence Analysis (FCA) or Similarity Analysis (SA) focus on synchronic analysis. By considering the text as a fixed picture of an event, they fail to seize its developmental aspects. It is a limitation as the life-story method invites to consider it as a diachronic succession of events, as a movie of which the end cannot be understood if it is not made clear that it follows the beginning and the middle.

The aim of this study is to face those problems in order to provide a rigorous life-study analysis of suicidal behavior. This is done with the development of an informatics tool: Highway_star.[1] The last is characterized by two main functionalities: gather numerical corpora of suicidal narratives online as a solution to the hardness of finding biographical data about the topic and generate textual visualizations that highlight the developmental part of the corpora.

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[1] Highway_star is registered as a Common Creative license. It is open access and free to use. Technical tutorials can be found on GitHub (https://github.com/matheo-daly/highway_star, consulted the 28/05/2021) or Pypi (https://pypi.org/project/highway-star/, consulted the 28/05/2021).

More specifically, a first part is dedicated to the state of art concerning life-story methodology and narrative suicidal studies. Facing the lack of suicidal life-story analysis, it becomes relevant to present the methodological perspective in a second part. The last is the opportunity to argue about the relevance of numerical corpora, as well as describing them and the theoretical framework that is to be used. The final part is dedicated to the analysis of the corpus. It is done in three times: the corpora are firstly qualitatively interpreted before some classical textual visualization algorithm are run onto them in a second time. Finally, the analytical feature of the Highway_star tool is presented and applied.

State of the art

The life story is an empirical ethnosociological method (Bertaux 1981; Catani and Mazé 1982; Ferrarotti 1983; Chanfrault-Duchet 1987; Linde 1993; Leahey and Yelle 2003; Schütze 2014). It consists of gathering biographical information about a specific phenomenon. As such it might be considered as a subcategory of biographical studies (Roberts 2002; Kelchtermans and Ballet 2002; Tsiolis 2012; Bühler 2012; Lockhart 2013; Filipkowski 2019), themselves being part of narrative studies (Connely and Clandinin 1987; Bruner 1990, 1999; Feldman et al. 1990; Polkinghorne 1995; Josselson and Lieblich 1995; Josselson 1996; Ochs 1997; Kapitzke 1998; Greenhalgh and Hurwitz 1999; Williams et al. 1999; Linde 2001; Pavlenko 2002; Bender 2003; Hauser et al. 2006; Hill 2007; Hammack 2011; Monteagudo 2011; Saban and Sarıçelik 2018). For example, Daniel Bertaux and Isabelle Bertaux-Wiame ask their volunteers, 'How did you become a baker?' (Bertaux and Bertaux-Wiame 1980a, b). The narratives gathered allow them to produce a highly comprehensive study of the phenomenon. One of the oldest works following this logic is the one of (Thomas et al. 1996), making of the first school of Chicago the precursor of the life-story methodology. It is clearly defined and used in the 1980s. Multiple variations of the idea of using biographical narratives show up in different countries. It is for example possible to think of Daniel Bertaux (Bertaux and Kohli 1984; Bertaux 2003, 2010) in France, Fritz Schütze in Germany (Schütze 2014, 2016a,b) or Charlotte Linde in United Kingdom (Linde 1993, 2001).

Many qualitative studies about suicide have been led. They offer multiple elements to improve the phenomenon's knowledge (Suto and Arnaut 2010; Perceval et al. 2018; Delam et al. 2020), model (Baechler 2009) and prevention (Crawford et al. 2009; Player et al. 2015; Bazrafshan et al. 2017; Elzinga et al. 2020). But there are few suicide studies that rely on the life-story approach (Maris 1991, 2002; Cohler and Jenuwine 1995; Sveticic and Leo 2012; River and Fisher 2014) and among them, none explicitly mobilize it through its ethnosociological shape (Burrick 2010). They differentiate themselves from more common epidemiological suicide studies by setting the focus on the growth process of suicidal risk, being referred to as 'developmental (or life course) perspective' (Van Orden et al. 2010, p. 8), but lack the heuristic depth provided by the ethnosociological theorization of the life-story method. Other narrative methods such as psychological autopsies are frequently used in order to invest suicide. It consists of gathering information from the

family and friends of the defunct, including some biographical elements (Shneidman 1981; Shafii et al. 1985; Duberstein et al. 1994; Hawton et al. 1998; Appleby et al. 1999; Yoshimasu et al. 2008). Another one relies on the content of suicide notes left behind after the death (Handelman and Lester 2007; Chávez-Hernández et al. 2009; Zaśko-Zielińska and Piasecki 2015; Shustov et al. 2018; Abaalkhail 2020). Closer to the life-story approach, the developmental method underlines the chronological phenomenon associated with suicide (Maris 1991, 2002; Sveticic and Leo 2012). Other methods such as the sociological autopsy (Scourfield et al. 2012) or the use of the coroner's data (Shiner et al. 2009; Gagnon and Perreault 2017) can be mentioned.

Firstly, a description of the life-story method is an opportunity to stress out its rich heuristic material. Secondly, a presentation of the pros and cons of the developmental perspective of suicide, psychological autopsies and suicide note studies gives some understanding of the under-representation of suicide life-story studies as well as elements to remedy to it.

The Life-Story Method

The life-story perspective takes its root at the beginning of the twentieth century and is popularized in the 1980s. It is a qualitative time-consuming method (Connell 2010) that grants a deep insight into the interactions between an individual's life and its social environment (Messerschmidt 1999; Connell and Messerschmidt 2005).

According to Bertaux (2010, pp. 49–50) the life-story's method might have three functions. The first one is exploratory and aims to discover the social field that is to be studied. The second one is analytic. Its purpose is to provide a rich analysis of a social phenomenon. The third one is expressive, meaning that life stories can be used to give a voice to marginalized populations who fail to be heard. In this work, the attention is directed to the second function, keeping in mind that most of what is said remain true for the first one. The perspective of Daniel Bertaux presupposes the existence of a '*stable central core* around which the construction of the narrative necessarily flows'[2] (Bertaux 2010, p. 77). The scientific purpose is to reach this core. It is made possible by what Clifford Geertz calls 'thick description' (Geertz 1977, p. 6). In practice, the aim is to reach 'the saturation of the model'[3] (Bertaux 2010, p. 33). It has to be stable, which can only be achieved if 'the scientist has given to reality every chance of destabilizing it'[4] (Bertaux 2010, p. 30). Bertaux's life-story's approach requires a whole epistemological shift as 'one should not expect the elaboration of a standard methodology' (Bertaux and Kohli 1984, p. 234). This manifesto for a renewal of the sociological epistemological framework meets some supports (Ferrarotti 1983; Clot 1989) but a more nuanced perspective aiming to compromise between the last and classical sociological epistemology can also be found (Chanfrault-Duchet 1987).

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[2] Un *noyau central stable* autour duquel se déverse nécessairement la construction du récit.

[3] La saturation du modèle.

[4] Le modèle ne peut être considéré comme stabilisé que si le chercheur a donné au réel toutes les chances de le déstabiliser.

Fritze Schütze defends the life story as a sociological tool (Schütze 2016a, b). For the German sociologist, 'Getting deeper into the riddles of autobiographical ramifications means studying the structural processes of life courses as such, and how the person attempts to come to terms with them' (Schütze 2014, p. 227). In this perspective, he theorizes five steps in order to make good use of the life-story method. It is firstly necessary to study how the text is produced and edited which allows to secondly describes its formal structure. It thirdly becomes possible to focus on an analytical abstraction of generalities, meaning interpreting the content of the narrative. If the method is applied to many narratives, in a fourth time, it is time to compare the texts in order to identify generalities and specificity. Finally, a fifth moment is dedicated to the building of theoretical models, in a way relatively close to what Daniel Bertaux suggests (Schütze 2014, pp. 230–232). The second step requires some knowledge in sociolinguistics. More generally, the last point of definition of the approach is its 'necessary' links to transdisciplinarity[5] (Bertaux 1983, p. 23). It is necessary to mobilize the content of neighborhood sciences in order to make the analysis as deep as possible. Reciprocally, even if the attention is directed to the ethnosociological method of life stories, many disciplines have adapted life stories to their use. Can be mentioned, literature (Hébert 1991), sociology, clinical sociology, psychology, neuropsychology, sciences of education or philosophy (Burrick 2010).

The intimate relation between the life-story method and transdisciplinarity offers an argument in favor of using it to study suicidal behavior. In 1975, Jean Baechler defends that the specialization and segmentation of sciences are slowing down suicide studies. He suggests that the notion of suicidology may be used in order to designate an academic position that is based on its topic—suicide—rather than its methods (Shneidman and Ortega 1969; Baechler 2009, pp. 10–11). Suicidology knows some fame as transdisciplinary studies growth under its naming (Silverman 2006; Cullen 2014; Fitzpatrick et al. 2015; Cozman 2019). However, life stories do not seem to be part of it, even if they get popular less than a decade after the initial work of Baechler.

Narratives studies of suicide

There is few, maybe none, ethnosociological life-story study of suicide. Some arguments can be found in order to explain it. The most obvious one is that a suicide implies by definition that the subject is dead and therefore unable to testify. There are some ways of dodging the dilemma. Three of them are discussed here, and each is the opportunity to present a type of narrative studies about suicide. It is firstly possible to gather testimonies from people who survived their suicide attempts. It is the opportunity to discuss the developmental studies of studies. Secondly, the psychological autopsy gathers biographical content from the family and friends of the deceased. Finally, the suicide notes studies rely on the narratives left behind by the people who killed themselves.

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[5] 'La transdisciplinarité: une nécessité'.

It is possible to study suicide through suicide survivors, either from a narrative perspective (O'Donnell et al. 1996) or epidemiological one (McIntosh and Kelly 1992; Palmieri et al. 2019). The flaw of this solution is that the statistical profile of people who died by suicide and those who survived it are radically different, especially considering gender repartition (Appleby 1996; Quan and Arboleda-Flórez 1999; Hawton 2000; Qin et al. 2000). The counter-argument takes into account the scale of the study. If it is true that national or supranational studies reveal a different behavior between suicide and suicide attempts, at an individual scale, suicide attempts are a strong predictor of lethal suicidal behavior (Brent et al. 1999; Suominen et al. 2004; Gibb et al. 2005; Coryell and Young 2005). The developmental studies of suicide gather a wide variety of works. They are united by a common interest for the multiple life events that can explain the growth of suicidal ideation and its evolution toward lethal suicidal behavior (Sveticic and Leo 2012). They lead to complete model of the phenomenon (Chew and McCleary 1994). For example, (Séguin et al. 2014) identify two typical suicide trajectories differentiated by various levels of the burden of adversity. Another example can be found in (Maris 2002) who uses developmental models to assess therapeutic efficiency of diverse treatment. If the quantitative developmental studies do not need to rely on the previously presented argumentation (Daniel and Goldston 2009; Mittendorfer-Rutz et al. 2013, 2014; Rivers 2017), it is not true of the more qualitative works (Ball 1988). Among the last, some studies identify morbidity factors such as 'parental or sibling suicides', 'culture and basic values' (Maris 1991) or psychiatric illness (Gunnell and Lewis 2005) and their interactions. This leads to the use of interactionist vocabulary, such as 'suicidal careers' (Maris 1981). The developmental studies of suicide gather different studies into a category that shares some characteristics with life stories. It is also possible to mention some works that inherit more directly from the last. (River and Fisher 2014)'s work about gender leads them to study the links between masculinity and male suicide, following the life-story methodology. Suicide and life story meet as a specificity of a gender study. Another phenomenon is that, concerning suicide, the life-story method fails to take its independence from the psychological autopsy. Even if the use of qualitative methods, and more specifically life-story approach, seems promising in psychiatry and suicidology (Mantaras and Matusevich 2012), no study showing a direct interest into suicide life stories have been found.[6] Life story is mobilized to assess the validity of the psychological autopsy approach (Cohler and Jenuwine 1995) or as a corollary of the last (Kawashima and Kawano 2017).

The development of the psychological autopsy method is strongly related to suicidology through the work of the clinical psychologist Erwin S. Shneidman. Its first mentions can be dated to the late 1960s (Shneidman and Ortega 1969). It is a procedure that 'has to do with clarifying the nature of a death' (Shneidman 1981, p. 42), especially when the cause of death is '*equivocal*'. More broadly, the psychological

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[6] A search on internet *Archive Scholar*, *Pubmed* and *Google Scholar* for the expressions 'suicide life story' and 'suicide life course' have shown no other results than the one discussed previously, excluding studies that claimed one of those appellation in order to present the results from cohort studies.

autopsy aims to answer the question: 'Why did the individual did it?' (Shneidman 1981, p. 47). In order to do so, Shneidman provides sixteen categories of items that are to be collected from the friends and family of the dead. An example can be given with the tenth category that aims to be a 'brief outline of victim's history (siblings, marriage, medical illnesses, medical treatment, psychotherapy, suicide attempts)' (Shneidman 1981, p. 49). The psychological autopsy does not need to postulate that the testimonies of suicide survivors are appropriate to understand lethal suicidal behavior. The limitations of the method rely on the credit that can be granted to the testimony of the family and friends. Loneliness and social isolation are established suicide risk factors (Heikkinen et al. 1994; Heikkinen and Lönnqvist 1995; Josselson and Lieblich 1995; Koivumaa-Honkanen et al. 2001; Rubenowitz et al. 2001; Waern et al. 2003; Nickel et al. 2006; Cousteaux and Pan Ké Shon 2008). It implies that an important part of those who kill themselves are socially deprived. Consequently, it seems unlikely that, in this situation, the close ones—not so close as it appears—are qualified to produce a relevant narrative about the individual who ended its life. However, no work seems to have deepened this critic and the popularity of the method, illustrated for example by the production of the 'next generation' psychological autopsy (Conner et al. 2011) might represent that this theoretical limitation is empirically irrelevant. The psychological autopsy's popularity for studying suicide begins in the middle of the 1980s (Shafii et al. 1985), grows in the 1990s (Duberstein et al. 1994; Hawton et al. 1998; Appleby et al. 1999) and explodes worldwide in the 2000s and after (Cheng et al. 2000; Isometsä 2001; Phillips et al. 2002; Cavanagh et al. 2003; Hawton et al. 2004; Zonda 2006; Bastia and Kar 2009; Yook et al. 2020; Affleck et al. 2020; Leenaars et al. 2020; Zhu et al. 2021; 최 et al. 2021; Choi et al. 2021; Zhou et al. 2021). Finally, the important number of suicide studies relying on psychological autopsies becomes in the middle of the 2000s the raw material of several meta-analysis (Arsenault-Lapierre et al. 2004; Yoshimasu et al. 2008; Cavalcante and Minayo 2012; Richardson et al. 2013; Too et al. 2018; Conner 2019; Conner et al. 2019). One way of explaining the method's success is to look at the numerous suicide risk factors it as allowed to identify and categorize by order of importance. For example 'mental disorders', 'previous suicide attempts', 'social isolation', 'physical illness', 'unemployment' and 'family conflict' (Van Orden et al. 2010, p. 47). This diversity and specificity are an important part of the development of 'second-generation models' (O'Connor and Kirtley 2018, p. 2) that describe suicide as a single protean process while having predictive values and providing a protocol apt to empirically discredit the model. Such models are Joiner's interpersonal theory of suicide (Joiner 2002; Joiner et al. 2002, 2005; Van Orden et al. 2010), O'Connor's integrated motivational-volitional model of suicide (O'Connor et al. 2009; O'Connor and Kirtley 2018) and Klonsky's three-step theory (Klonsky and May 2015). From an ethnosociological perspective, the psychological autopsy lacks in-depth understanding of its subject. The information gathered is mostly quantitative. If this allows the development of predictive models and meta-analysis, it does not provide strong evidence to answer qualitative subjective questions. In other words, it has low heuristic virtues, because it quantifies and standardizes the gathered testimonies. This being said, the methodological balance benefit/

loss of the psychological autopsy remains widely positive from an epidemiological perspective.

One way of qualitatively studying suicide while maintaining a level of objectivity compatible with more quantitative works is to analyze the narratives left behind by those who put an end to their lives. Two methods mostly inhabit the field of suicide death notes studies. Firstly, psychologists use those qualitative corpora to identify some at risk personalities (Shustov et al. 2018) or cultural behavior (Chávez-Hernández et al. 2009) in order to improve suicide prevention (Foster 2003). Secondly, linguists have interest in suicide death notes (Ham et al. 2014; Zaśko-Zielińska and Piasecki 2015). It represents a literary genre in itself with its own specificity (Abaalkhail 2020). It is for example possible to some extent to differentiate narratives written by people who survived their suicide attempt from those who died (Handelman and Lester 2007). Finally, and more marginally, suicide death notes are studied from other perspectives. For example, in criminology (Perreault et al. 2016) found out that narratives written in a country at a time when attempted suicide is a crime, such as Canada before 1972, often expose a sensation of guilt linked to the sensation of having committed a crime. Suicide death notes studies have many pros. They allow differentiating lethal and non-lethal behavior. While being qualitative, the content is objective as the narrative is not prone to change, depending on the interviewer or a post-event particular situation. Finally, as data is written textual content, it allows more efficient linguistic analysis as for oral narratives. However, those approaches also have their cons. As the narrative is already written, it is not possible for an interviewer to ask for specific information. It is also impossible to create an intimate relation with the subject nor to directly evaluate the context of production of the text.

Transition

More generally, suicide studies count many narratives and quantitative works. Lately, they mostly tend to aim for a better prevention of the phenomenon. The most popular approaches are developmental studies, psychological autopsies and suicide note studies. Even if no methodology is perfect, they are adapted to the specificity of suicide: dead people cannot testify, the survivors and the deceased are statistically different, collecting data from suicidal people is sanitary and ethically sensitive. Few, if none, ethnosociological life-story methods are used to analyze suicidal narratives. It could seem surprising as it is an efficient way to dynamically study the biographical trajectories of individuals. It is explained as the limitations implied by the study of suicide constrain to many adaptations. One result of them being the developmental studies. The last, psychological autopsies and suicide note studies share the common point of being partially quantitative in order to maintain some compatibility with the psychiatric and epidemiological stances that hold a hegemonic ground concerning suicide studies. It leads to a second explanation concerning the lack of success of life stories to analyze suicide. The ethnosociological method misses a quantitative ground in order to maintain a continuity with the hegemonic field of suicide studies. Considered as a postulate, this proposition leads us to design

an investigation method whose aim is to maintain the heuristic depth of the life-story method while quantifying some of it in order to study suicide.

Method

The ethnosociological life-story method is not directly relevant to study suicide. While promising, it needs to be adapted to its object of study. A choice must be made between prioritizing self-told non-suicidal narratives and lethal suicidal behavior stories written by others. The second option is explored. It leads to the constitution and exploitation of two corpora composed of Wikipedia's biographies of people who died by suicide. Following the formal presentation of the corpora, a few words are said about Schütze's theoretical framework that is to be used in the analysis (Schütze 2014).

Wikipedia mining

It is necessary to face the methodological and ethical challenges related to the qualitative study of suicide. The discussion following the last will lead to the conclusion that the comparative use of biographical content is an interesting solution. It will then be argued that the online encyclopedia Wikipedia offers such narrations. After retrieving data from it, a final paragraph is dedicated to the statistical presentation of the corpora.

Some problems must be solved in order to study suicide using the ethnosociological life-story method. As people who committed suicide are dead by definition, it is not possible to directly apply Bertaux's method that requires an interview (Bertaux and Bertaux-Wiame 1980a, b). A way of solving this issue is to gather testimonies from suicide survivors. However they appear to have distinct sociodemographic (Appleby 1996; Quan and Arboleda-Flórez 1999; Hawton 2000; Qin et al. 2000) and narrative (Handelman and Lester 2007) profiles. The closest ones are 'serious suicide attempts' survivors, defined as suicide behavior that should have been deadly but haven't been for any other possible guessable phenomenon than pure luck (O'Donnell et al. 1996; Beautrais et al. 1999). As they are scarcer than suicides, it is almost impossible to design in practice a study relying on them, especially if it is taken into account that the suicide narration should be registered immediately after the act, in order to avoid any memory bias that would imply a reconstruction of the situation (Bloch 1995; Conway and Pleydell-Pearce 2000). If the last limitation is practical and could theoretically be solved by an efficient organization, gathering narrative from suicide survivors implies a sanitary and ethical dilemma. Following such experience, individuals are psychologically weakened. Illustrating this can be mentioned the rising rate of lethal suicide that accompanies the discharge from inpatient care (Motto and Bostrom 2001; Yim et al. 2004; Hunt et al. 2009). Exposing sensitive people to an intrusive life-story interview, specifically focusing on their recent suicidal behavior, might imply and health state aggravation hardly compatible with the '*Primum Non Nocere*', 'First of all, no harming', around which

western medicine revolves. This difficulty opens a debate of ethical nature: from a sanitary perspective, is the balance benefit/risk positive? Is it worth risking to some extent the life of an individual now in hope of indirectly saving others latter? Those interrogations have implications that get out of the topic of this text. A final empirical argument is called in order to end the discussion. In the middle of the major sanitary crisis that is the SARS-Cov-2 pandemic, it seems appropriate to prioritize the precautionary principle and avoid any hospital-related activity that could eventually bring harm (Hanna et al. 2020; Raposo 2021). As life stories are not to be directly gathered, another solution must be found. Following the same general directions as suicide notes studies, it is interesting to seek the biographies of people who killed themselves. It is possible to find scarce autobiographical elements, such as letters (Lacoste 2011; Cantrell 2015; Delia 2015) or diaries (Cobain 2003), written by famous people who died by suicide. Biographies redacted by professionals are more common (Lee 1999; Spoto 2001; Eiland and Jennings 2016). Those narratives safely offer life-course elements at the price of the intimacy of the interview. Mobilizing a corpus of books produced in different conditions, with shifting editorial lines imply a potential differentiation between biographies linked to editorial choices rather than life paths. Additionally, paper support is not adapted to textual analysis. A priceless tool solving all those difficulties can be found on the internet: Wikipedia.

Quoting itself, 'Wikipedia is a free multilingual open-source wiki-based online encyclopedia edited and maintained by a community of volunteer editors'.[7] It is popular and unique as it was in 2017 the 6th most visited website in the world and is the only donor-supported website in the top 50 list (Guldbrandsson 2014). (Firer-Blaess and Fuchs 2012) assign this specificity to what they consider being a successful info-communist politic and economic system. Many studies show interest into the profiles of the contributors (Anthony et al. 2009; Gyllstrom and Moens 2012; Joubert 2020), the history of the platform (Thornton and McDonald 2012) or the reliability of its content (Jullien 2012). (Hinnosaar et al. 2019) experimentally demonstrate the impact of Wikipedia by adding information to the pages of small cities and assessing a rise in their touristic activities. The Open-access ideology of Wikipedia also makes of it a very interesting database for multiple purposes. For example (Russell et al. 2013) created a tool that links the parts of a famous place's photography to the words of its Wikipedia's page, a specific Roman colonnade. (Hwang et al. 2015) saw in the Wikipedian's formalism an opportunity to train an algorithm to write proper sentences. This use of the encyclopedia is referred to as 'Wikipedia mining' (浩太郎et al. 2009). There are multiple benefits of using Wikipedia's content in a sociological study. It contains information about some people's lives. That information is public, overall reliable (Brown 2011) and can easily be retrieved thanks to the MediaWiki API. The texts also have the advantage of following a standardized shape and level of speaking that makes it easier to compute with software. Concerning suicide, gathering life stories of people who killed themselves on Wikipedia has two major advantages. Firstly, it is almost certain that they have committed suicide as

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[7] https://en.wikipedia.org/wiki/Wikipédia, consulted the 25/05/2021 at 3:56 p.m. Direct link to the quoted version: https://en.wikipedia.org/w/index.php?title=List_of_Wikipedias&oldid=1024647115.

the content of the pages is the result of an encyclopedic research approved by other Wikipedia's users. Secondly, as data are public, the ethical discussion is less challenging as there is no sanitary risk of involuntarily degrading an individual's health.

Retrieving data from Wikipedia can be done using the MediaWiki API. Some code using it can be found in the self-made, open access, free to use, Highway_star tool[8] whose other functionality will be discussed later. It currently takes two information as input. The first one is a Wikipedia category and the second one is the language in which the corpus is to be retrieved. The encyclopedia is structured, meaning that most of the pages are included into categories. For example, the pages of Kurt Cobain, Gilles Deleuze and Walter Benjamin can be found in the category 'male suicides'. The software crawls in the category and index all the pages it contains. The language setting has two functions. The first one is self-explanatory and allows the user to choose the language of the study. The second one is linked to the structure of Wikipedia, that might vary. For example, in French, every page of a human possesses a 'biographie' part, while in English, there are many possibilities, such as 'early life', 'early life and career', 'career', 'death' and 'end of life and death'. The language setting identifies the parts of the Wikipedia's page that are to be scrapped. For example, in the category 'female suicides', subcategory 'female suicide bombers', there is a page named 'Black Widow (Chechnya)' that defines behavior of Islamist Chechen female bombers following the second Chechen war. As this page is not linked to a specific human, it does not have an 'early life' or 'career' part, meaning none of it content will be in the corpus. This point guarantee that only human lives are analyzed.

Two suicide-related corpora are retrieved from Wikipedia in order to allow the analysis to partially rely on comparison. The first one gathers the content included in the category '1920s suicides' as they appear on the 26/05/2021 at 3:56 p.m.[9] From those pages, only the content of the parts 'Early Life', 'Early Life and Career', 'Career', 'Death', 'End Life and Death'. Among the 420 pages of the category, 82 contain at least one of the previously defined parts, making the first corpus a set of 82 biographies. The second corpus follows the same rules of building with the pages of the Wikipedia category '2020s suicides' as it was the 26/05/2021 at 3:38 p.m.[10] Among the 125 pages, 49 biographies are included. They are enumerated from 1 to 82 for the 1920s corpus and from 100 to 148 for the 2020s corpus. This number is written in brackets when a biography, or a part of it, is quoted to ensure source verification. The gender distribution of the corpora is qualitatively retrieved by identifying the pronouns he/his and she/her from the texts. It was sometimes impossible to assign a gender to a biography. It occurred 6 times (7.32%) in the 1920s corpus, an example being: 'The morning of September 24 1928, Speakman died of a self-inflicted gunshot wound at Bellevue Hospital. Speakman's body was cremated'

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[8] The tool developed is registered as a Common Creative license. It is open access and free to use. Technical tutorials can be found on GitHub (https://github.com/matheo-daly/highway_star, consulted the 28/05/2021) or Pypi (https://pypi.org/project/highway-star/, consulted the 28/05/2021).

[9] https://en.wikipedia.org/wiki/Category:1920s_suicides, consulted the 26/05/2021 at 3:56 p.m.

[10] https://en.wikipedia.org/wiki/Category:2020s_suicides, consulted the 26/05/2021 at 3:38 p.m.

(72). The phenomenon is more frequent in the 2020s corpus. 11 narratives' gender (22.45%) are unidentified: 'Coleman was born to Melinda, a veterinarian' (112). The gender distribution of the corpora is presented while excluding the unidentified biographies to allow comparison with official statistics about suicide. The 1920s corpus counts 66 (86.84%) males and 10 (13.16%) females, while the 2020s' is composed of 28 (73.68%) males and 10 (26.32%) females. Worldwide, lethal male suicide is in average 2 to 4 times more frequent (Hawton 2000; Qin et al. 2000; Ritchie et al. 2015), while it is the opposite for non-lethal suicide behavior (Chan Chee and Jezewski-Serra 2014). With a ratio of 1 to 3, the 2020s corpus seems coherent with the statistical data of suicide. Controversially, the 1920s corpus shows an over-representation of male suicides that can be explained by early 20th gender inequalities (Lorber 2010; Kabeer 2015) that would both lower the chances for women to acquire fame and for famous women to get their biography written. Another point regarding gender needs to be discussed: the absence of non-binary gender. They represent the minority of the transgender people who do not recognize themselves in of the classical male/female gender category. Even if studies concerning non-binary people are scarce (Deutsch 2016), the 2000s have seen an important growth of transgender studies (Blanchard et al. 1987; Conway 2002; Stryker and Whittle 2006; Olyslager and Conway 2007; Schilt and Westbrook 2009; Sironi 2011), leading to the conclusion that it is an endangered population regarding suicidal behavior (Clements-Nolle et al. 2006; Johns 2019). It may seem inappropriate to neglect this population when studying suicide and this point knows few counter-argument. However, as the content of the narratives does not give specific information about it, there is no way of investigating it. Additionally, non-binary gender is statistically marginal (Olyslager and Conway 2007; Johns 2019), the small size of the corpus makes it likely that none of them is represented.

Theoretical framework

The theoretical framework prone by Fritz Schütze (Schütze 2014) has multiple benefits that seem appropriate for the current study. Firstly, Schütze's work is an interesting compromise of linguistic adapted to a sociological epistemological ground in order to analyze life stories (Schütze 2016a). Secondly, his approach does not depend on the handover of interviews, as shows his analyze of Robert Rasmus (Schütze 2014) whose biography is extracted from (Terkel 1997). Thirdly, if his method can be applied to a single case, he supports multi-biography studies and provides a reading grid accordingly. Finally, Schütze's model is well structured, which ease its application, notably jointly with quantitative informatics tools.

It is necessary to describe how the text was produced and edited. More specifically, the aim is to distinguish 'authentic extempore narration of personal experiences' from 'pre-planned and calculated, mostly argumentative, presentation' (Schütze 2014, p. 230). The two corpora follow Wikipedia's editing rules, as they

can be found online.[11] Doing so, the narratives are almost entirely redacted with a neutral encyclopedic tone. Exceptions can be found in the shape of quotations from the deceased or other involved individual, e.g., 'investigative sources quoting him as saying, "Many hateful messages had been posted, and I followed suit. I'm sorry."' (123). The communicative schemes of the text imply a low emotional implication. It is both a con as it will make it difficult for the analysis to render subjective human experiences, and a pro as it grants the corpus a unity that will avoid the texts to be influenced by the sentimental implications of the biographers.

It is then interesting to describe formally the corpora. This description has two facets. The first one is lexicometrical and intend to give it a first overview. The second one carries the 'attention on the narrative representation of the text', notably by identifying the structural shape of the wording (Schütze 2014, p. 230). The 1920s corpus counts an average of 18.02 words per sentence and 6.07 letters per words. Those values are respectively of 16.72 and 5.92 for the 2020s corpus. They are consistent with the average 17 words per sentences of standard English (Flesch 1949, pp. 149–150; DuBay 2004, p. 22). Overall, the longest text counts 140 sentences and 3179 words, while the smallest counts 1 sentence of 6 words. Merged together, the corpora include 131 biographies composed of 29,300 words. Among the last, 5423 different forms can be identified (words radical or infinitive) and 2897 words only appear once (hapax). All narratives can be classified into 3 types of structures. Type C (Chronological biography) depicts the individual's life from its beginning to its death. It is more common among long texts and is objectively identified by the use of the expression 'born' at its beginning, e.g., 'Brady was born in Forest City, Missouri, in 1870' (33). Type D (Descriptive biography) focuses on the occupation of the individual, which is set forward at the beginning of the narrative, e.g., 'Reckful was a talented World of Warcraft player' (139). It is more common among average length texts and can occasionally be found among the long ones. Type S (Suicide oriented biographies) focuses on the suicidal behavior itself and is very frequent among short biographies. The specific moment of death is set forward and the method is often specified, e.g., 'On 27 September 2020, at 2:00 a.m. (JST), Takeuchi was found hanged' (142). The distribution of each type differs from one corpus to the other. In the 1920s corpus, type C is the more common, concerning 42 narratives (51.22%), followed by type D (25, 30.49%) and type S (15, 18.29%). In the 2020s corpus, type C, D and S are equally represented, respectively concerning 15 (30.61%), 17 (34.69%) and 17 (34.69%) narratives.

The third time of the study is the one of the qualitative analysis. It consists of identifying 'cues for general features occurring within the text material, which can supposedly be also found in other topically comparable text materials' and inversely spot 'what seems to be *unique of the case* under study' (Schütze 2014, p. 230). Phrasing it differently, the ground of interpretation of the corpus relies on the identification of general and specific narrative's content, as compared to what could have been expected from such text in view of the scientific literature about the topic. As it is not a matter of describing the corpora, the realization of this phase belongs in the last part of this text.

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[11] https://en.wikipedia.org/wiki/Wikipedia:Editing_policy, consulted on the 18/08/2021 at 3:42 p.m.

The same can be said about the two following steps that are optional and specific of multi-case life-story studies.

The fourth step of Schütze's method is only applicable to corpus containing multiple stories, as it relies on the comparison of them, one to the other. The aim is 'to detect *various alternative* socio-biographical processes and their features within the field under study, to depict the *basic mechanisms* and features *common* to all the *alternative processes'* (Schütze 2014, p. 231). Following the second steps' identification of identical structures, the 4th one shows interest in the content, following the same principle. The contrastive comparison of the various texts of the corpora is the core of the analysis.

Finally, the ultimate goal is to create a model of the situation. Two steps are required. Firstly, the model per se is built, by explaining, 'the ideational kernels of process mechanisms and their social conditions of functioning ("social frames")' (Schütze 2014, p. 231). Secondly, the model is upgraded and kept up to date through confrontation 'with fresh empirical materials which had not been utilized yet for constructing the theoretical model(s)' (Schütze 2016a, p. 232). The last point shows interesting structural similarities with the supervised learning machine learning tasks, used in informatics to train an algorithm with specific data set followed by an evaluation using a different one (Russell et al. 2010; Mohri et al. 2012). This structural similarity makes possible to imagine an informatics model of life stories that would use mathematics tools relying on a sociological epistemological ground. As this final step of the analysis is the accomplishment of a field of study, it exceeds the ambition of this paper. No model creation will be attempted.

Transition

Qualitative studies of suicide face numerous limitations of methodological, ethical and sanitary order. Relying on public numerical data is a way to solve some of those issues. In this order, two corpora of suicide narratives have been retrieved from Wikipedia. The first one concerns the 1920s decade, and the second the 2020s. It has been the opportunity to present one functionality of the Highway_star tool developed to create data visualizations of life stories. The use of corpora extracted from Wikipedia comes with some limitations. They mostly concern the representativeness of the narratives as only famous people have a Wikipedia page and the detachment implied by the biographies not being autobiographies. Finally, the work of Fritz Schütze concerning the life-story method is presented, and with it a quantitative description of the corpora reveals a language level consistent with standard English. Schütze brings to the study a strong theoretical frame in which the qualitative analysis can occur while allowing the use of more quantitative tools.

Analysis

The analysis of the corpora relies on three major steps. Firstly, a classical ethnosociological interpretation is drawn, following Fritz Schütze methodology. However interesting, the last can be enhanced by textual visualizations that allow quantifying the interpretation while identifying points of interest that might have been unseen. Structural and lexical analyses are run, but they tend to consider the narrative as a fixed unchanging speech. In order to visualize the diachronic part of the stories, the Highway_star tool is finally presented. The last aims to provide textual visualization specifically adapted to life stories and biographical narratives.

Schützean analysis

Steps 3 and 4 of the Schützean methodology are considered. The 3rd one is the opportunity to discuss previous qualitative works based on suicidal narratives, while the 4th one leads to the first comprehensive observations of the corpora.

The analysis firstly relies on the comparison of the texts with other studies' corpora. This first step of the analysis represents the opportunity to compare this study with academic works closer to it and more marginal than the developmental studies, the psychological autopsies and the death note analysis previously described. In 1975, Jean Baechler publishes the results of his ten-year-long thesis (Baechler 2009). He gathers and analyzes narratives about suicide from various sources: ethnographical, historical, press, etc. His corpus shares common points with our corpora as it consists of multiple suicide life stories told from an outsider's perspective. However, it also includes more general presentations of how suicide is dealt with in specific social environments. Baechler uses this qualitative data to build a model of suicidal behaviors, understood as plural. They are conceptualized as the best subjectively perceived solution to a problem by individuals (Baechler 2009, p. 120). Both problems and people's characteristics lead to the identification of 11 suicides idealtype gathered in 4 categories: escapist (flight, mourning and punishment), aggressive (crime, revenge, blackmail and appeal), oblative (sacrifice and crossing) and playful (ordeal and games) (Baechler 2009, pp. 129, 267 and 497).[12] Some of them can be found in Wikipedia's corpora while others are absent. Giving some examples of it seems to be an interesting way of locating corpora within previous qualitative suicide theorization without specifically referring to each of the narratives. As only the lives of celebrities can be found on Wikipedia most of the biographies focus on the accomplishment of the individuals rather than their death, making it difficult to clearly identify a suicidal ideal-type. The less equivocal narrative relates stories in which the reason for fame is the suicide itself. A first example can be given with the biography of Carl Großmann (16), a suspected murder, whose suicide can be interpreted as a flight from justice. Another example is the one of crime suicide

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[12] 'Suicides escapistes (fuite, deuil, châtiment), suicides agressifs (crime, vengeance, chantage, appel), suicides oblatifs (sacrifice, passage) et suicides ludiques (ordalie, jeu)'.

when an individual kills both himself and somebody else such as Den Hollander: 'The day after the attack on Salas's family, Den Hollander was found dead from a self-inflicted gunshot wound in Rockland, Law enforcement officials told The New York Times that the Walther semiautomatic pistol Den Hollander used was of the same caliber as the weapon used in both the California shooting and the New Jersey shooting. 'Immediately after the discovery of Den Hollander's body, authorities identified him as the "primary subject" in the attack against Salas's family.' (113). Overall, oblative and playful suicide are hard to identify in the corpora. On one hand, they tend to be scarcer (Baechler 2009, pp. 230, 576) and, on the other, they imply a mode of death close to accident that requires more in-depth information to identify. However, general tendencies among subcorpuses can be noticed.

A hypothesis of the study was that there will be some noticeable differences between the 1920s suicidal biographies and the 2020s one. Upon reading the corpora, no such thing was identified. As mentioned previously, the variations were of degree rather than modalities. Life courses of politicians (e.g., 1 and 100), artists (e.g., 2 and 115) and businessmen (e.g., 3 and 107) can be found alike in the two corpora. If there are no major differences on a global scale, there is still some content that seems linked to the decade. Religion is only seen in the 1920s corpus. No biography entirely revolves around it, but the links between the individual and religion is sometimes noted. For example, 'Bentley was born as William Begg in Edinburgh, Scotland, the son of Maria Faithful and the Reverend James Begg, a Presbyterian preacher' (61). Scarce in the 1920s corpus, this information cannot be found in the 2020s corpus. Another intriguing fact concerning the 1920s corpus is the absence of references to the First World War. As the second one is strongly linked to suicidal behavior, even decades after its end (Bedard and Deschênes 2006; Weisz 2015; Sandman et al. 2017), no narrative seems to directly mention World War I as an important factor of death. An explanation could be that, more than the war itself, it is the persecutions of the WWII that caused suicidal ideation by making life unbearable for people of both sides. Concerning the 2020s corpus, the development of new technologies, notably the internet, is associated with new profiles. Already quoted, the Bernstein, alias Reckful, life course is an interesting illustration of this point. His fame is related to impressive skills on the videogame World of Warcraft: '[…] he finished in the top 0.1% of the game, without the use of what was considered essential gameplay mechanics at the time […]' (139). Online games are an important source of human interactions for players (Chen 2009). The brutal death of an important member of the community is followed by multiple tributes paid by players and developers: '[…] in August 2020, Blizzard and World of Warcraft paid tribute to Bernstein with an in-game trainer, named after his online alias Reckful. The character is placed inside the Cathedral of Light, an in-game landmark where the community gathered to pay Bernstein a tribute following the news of his death' (139). The gender variable brings additional information. In the 1920s corpus, women narratives tend to be less exhaustive. When it is possible to identify the reason of fame, it is always linked to an artistic activity, mostly acting (12), writing (51) or painting (65). In the 2020s corpus, women's professions are more various: television host (111 and 114), athletes (123 and 101) or politicians (131). It might be an illustration of a diminution of gender inequality through the twentieth century, as the

statistical description of the corpora was presupposing. However, gender differences remain important in both corpora. The means used to accomplish suicide greatly varies, while men tend to die of 'self-inflicted gunshot' (72) and 'jumping from the 10th floor' (148), women commit 'suicide in the water' (131) or by 'ingesting cyanide' (32). This is consistent with epidemiological data about the topic (Kreitman and Platt 1984; Araki and Murata 1986; Conwell et al. 1998; Cutler et al. 2001; Hem et al. 2004; Ambalavan et al. 2019).

The qualitative exploration of the corpora through comparative analysis allows identifying some phenomenon. It appears that suicide by itself has not changed a lot during the twentieth century. Variations are related to technological evolution, and the social behavior that are linked to it. Concerning gender, the most important changes are associated with the rise of opportunities for women to become famous rather than a suicide-related change. Some epidemiological gender differences can be illustrated by the content of the narrative, specifically concerning the means of death. The qualitative interpretation of the content of the narratives allows deepening the structural analysis. It gives a signification to some of its observations: e.g., while the structural analysis shows an under-representation of women in the 1920s corpus, the qualitative interpretation invites to consider that the reason is that it is harder for women to become famous in the 1920s than in the 2020s. The analysis can be improved by quantitatively describe the qualitative content of the narratives.

Data visualization

Some algorithms allow to quantitatively describe textual contents. Three of them are to be applied to the gathered narratives. The Hierarchical Descending Classification (HDC)[13] identifies statistically independent groups of words by evaluating the strength of correlations between the expressions (Reinert 1983, 1990). It represents the results obtained with a dendrogram. The Factorial Correspondence Analysis (FCA)[14] relies on the inertia of some parts of the cloudwords representation of a corpus. It represents narratives with a focus on the notion of distance from an axis of inertia. While the HDC and FCA globally take into account the corpus, the Similarity Analysis (SA)[15] computes the connectedness of the corpus. It shows with a tree the links that can be observed between the words. They are computed with the R interface IraMuTeQ (Jean-Jacques 2013).

The HDC identifies five classes. The 5th one is the more distant from the other ones. It is the second biggest as it concerns 23.2% of the corpora. Most of the biographies included are either concerning a male, a 1920s death or a type C (chronological) structure. The content of the class refers to political behavior with words such as 'president', 'government' or 'constitution'. On the opposite, the 2nd class mostly includes female and type S (suicide focused) narratives. The vocabulary related to it refers to death, which is consistent with it including mostly type S texts. The 1st

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[13] Classification Descendante Hiérarchique (CDH).

[14] Analyse Factorielle de Correspondances (AFC).

[15] Analyse Des Similitudes (ADS).

class is the most represented among the corpora, concerning 31.35% of it. Mostly composed males dead in the 2020s whose biographies are of type D (descriptive). The content is linked to the description of people's lives. It gathers expressions linked to the fame that might explain why someone reached fame in the first place, with expressions such as 'film', 'star' or 'television'. Classes 3 and 4 represent a minority, respectively 15.5% and 11.71% of the corpora. They are both related to 1920s suicide, but differs as the 4th one is related to male narratives and artistic content, the second one is associated with female biographies and family content. The HDC algorithm allows to identify five classes that highlight some previous hypothesis (Fig. 1). The male and female life stories tend to differ while the decade of death seems to play a less important role, as the class 2 is not specifically linked to any decade. The five categories are well identified, even if classes 4 and 1 may seem to be variations of the fame theme. They diverge as the 4th class is mostly linked to the 1920s decade and the 1st class to the 2020s one, an interpretation being that it was easier to achieve fame in the 1920s by being a writer, while in the 2020s the cinema industry have become the main celebrity provider.

The FCA accentuates the relevance of the three widest classes while showing that classes 4 and 3 share many characteristics (Fig. 2). The last takes a central part that links the three others, well-identified, narrative themes: celebrity, politic and death. Modalities of variables might also be represented within the FCA in order to improve the understanding of the roles of the previously established categories (Fig. 3). It reveals that the 2nd class, related to death, precisely gather crime suicide according to Baechler typology (Baechler 2009, p. 174), unknown gender and suicide-related narratives. The other classes are closer to the middle of the graph, meaning that they don't distinguish a lot from each other. The identification numbers of the narratives are registered as modalities from an 'id' variable. This allows identifying specific biographies as examples for a certain class. First of all, the text n.1 appears to be a very important part of the 5th class. It carries by itself the majority of the textual content of this category, being the longest story of the corpora (3179 words). This invites to consider the 5th class more lightly. Not only the HDC identified it as being distant from the rest of the corpora, but the FCA shows that most of its content is related to a single narrative depicted with a lot of details. Examples concerning the different classes can be provided. Regarding the 2nd class, biography 47 seems to be representative. It goes as follows: 'Frank Butler was born in County Longford, Ireland, and moved with his family to the United States at the age of 13. Annie died on November 3, 1926 in Greenville, Ohio. One biographer reported that Butler stopped eating after his wife's death, leading to his own death from malnutrition and starvation 18 days later, in November 21' (47). The 1st class biographies tend to be longer and mostly focuses on the career of the people rather than their death: 'he made his motion picture debut in 1921 in a secondary but good role in the Goldwyn Pictures silent film comedy Pardon My French directed by Sidney Olcott. That same year he appeared as Saul "Little Buzzard" Hatburn in Tol'able David, directed by Henry King for Inspiration Pictures. The acclaimed film was voted a Photoplay magazine's medal of honor. Over the next eight years, Yearsley appeared in another twenty films, in secondary or minor roles. One of his more notable roles was in Harold Lloyd's 1927 film The Kid Brother' (73). Classes 4 and 3 biographies
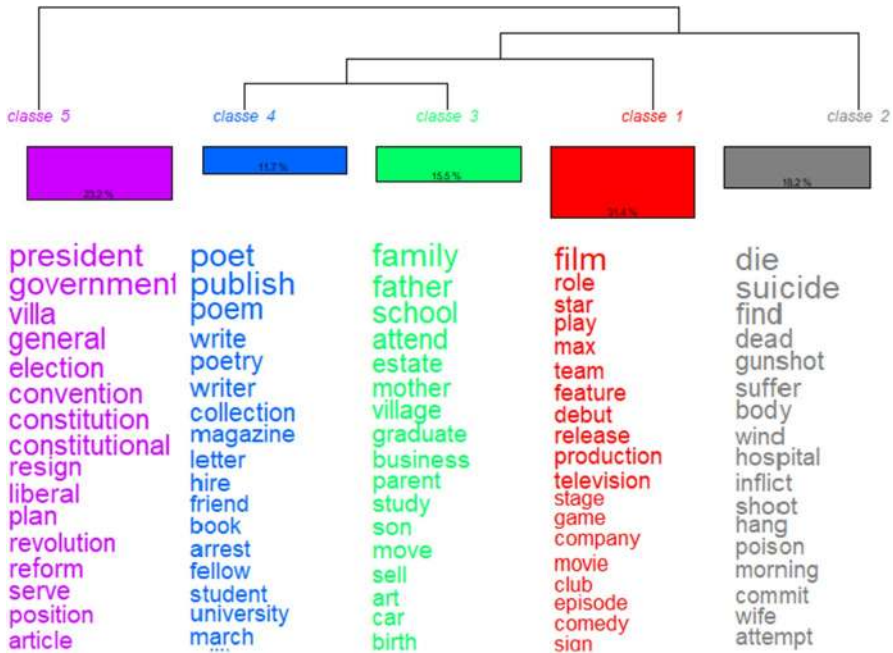
Fig. 1 Hierarchical descending classification (HDC) of the 1920s and 2020s Wikipedia corpora, by IRa-MuTeQ

are very long. As their central position is suggesting, they have some elements of all other categories and tend to narrate the whole lives of individuals.[16] The biography 45 appears to be central. It is composed of 120 sentences, making it much longer than the average 14.63 sentences long narratives of the 1920s corpus in which it belongs. The first three sentences of the story might be quoted in order to illustrate this central position: 'Sergei Yesenin was born in Konstantinovo in Ryazan Governorate of the Russian Empire to a peasant family. His father was Alexander Nikitich Yesenin (1873–1931), his mother Tatyana Fyodorovna (nee Titova, 1875–1955). Both his parents spent most of their time looking for work, father in Moscow, mother in Ryazan, so at age two Sergei was moved to the nearby village Matovo, to join Fyodor Alexeyevich and Natalya Yevtikhiyevna Titovs, his relatively well-off maternal grandparents, who essentially raised him […]' (45).

Finally, the SA highlight important nodes of the narratives (Fig. 4). Some of them can be associated with the thematic groups identified by the HDC and the FDA. Two groups centered around the words 'die' and 'suicide' may refer to the HDC 2nd class. Another one appears related to the HDC 1st class, both centered around the word 'film'. Being a structural analysis, the SA reveals that the HDC classes are located

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[16] Note to the editor: the biography 45 is both central and important. It might be interesting to make the text available somehow. However, the last is 2446 words/13,638 letters long so I haven't included it in the text.
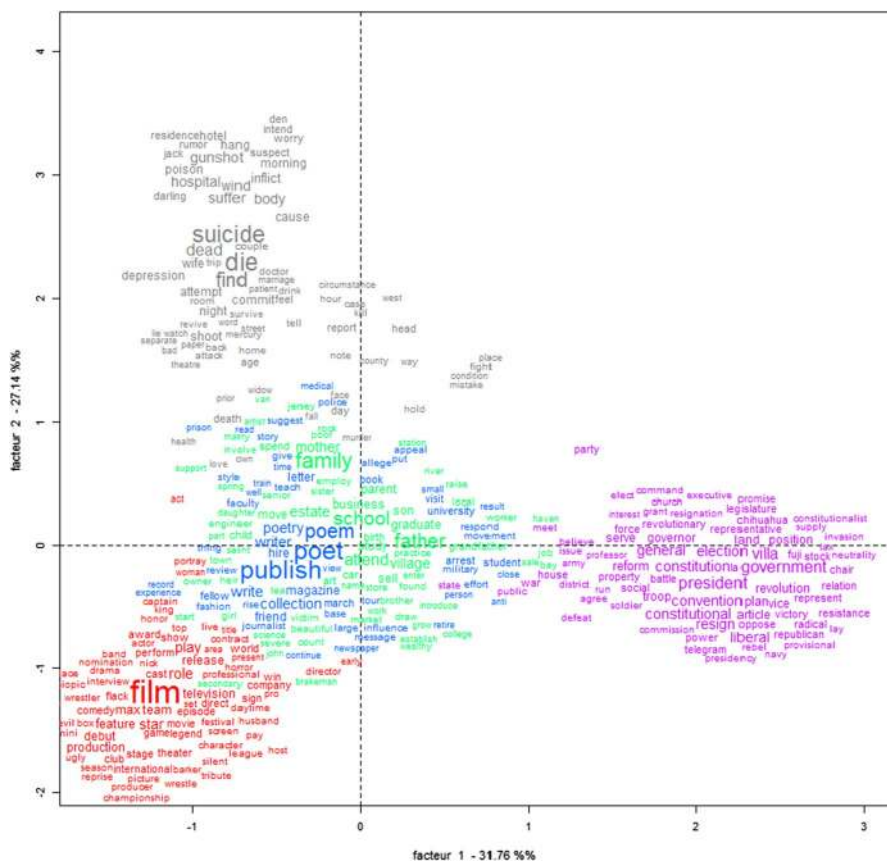
Fig. 2 Factorial Correspondence Analysis (FCA) of the 1920s and 2020s Wikipedia corpora, by IRa-MuTeQ

around descriptive expressions related to the environment ('year', 'august', 'march') or the life courses ('born', 'family', 'marry'). An exception can be found with the 'carranza' group of words, as it appears to be very distant from the center of the representation. The explanation relies within the corpora. Carranza is the name of the individual of the narrative 1, meaning that the marginality already identified by the HDC and the FDA is supported by the SA.

HDC, FDA and SA bring additional information to the study. Some of them illustrates the conclusions drawn by the qualitative comparative analysis, such as the proximity of the 1920s and 2020s corpus (both of them being in the center of the FDA) while having noteworthy differences (the first being positive on the FDA's Y-axis and X-axis, the second being negative on both the axes). One of those differences is gender. It is represented by the HDC dendrogram that autonomously classifies male and female into different categories. The quantitative analysis also underlines information that has been underestimated such as the role of very short narratives that brings few information to the qualitative
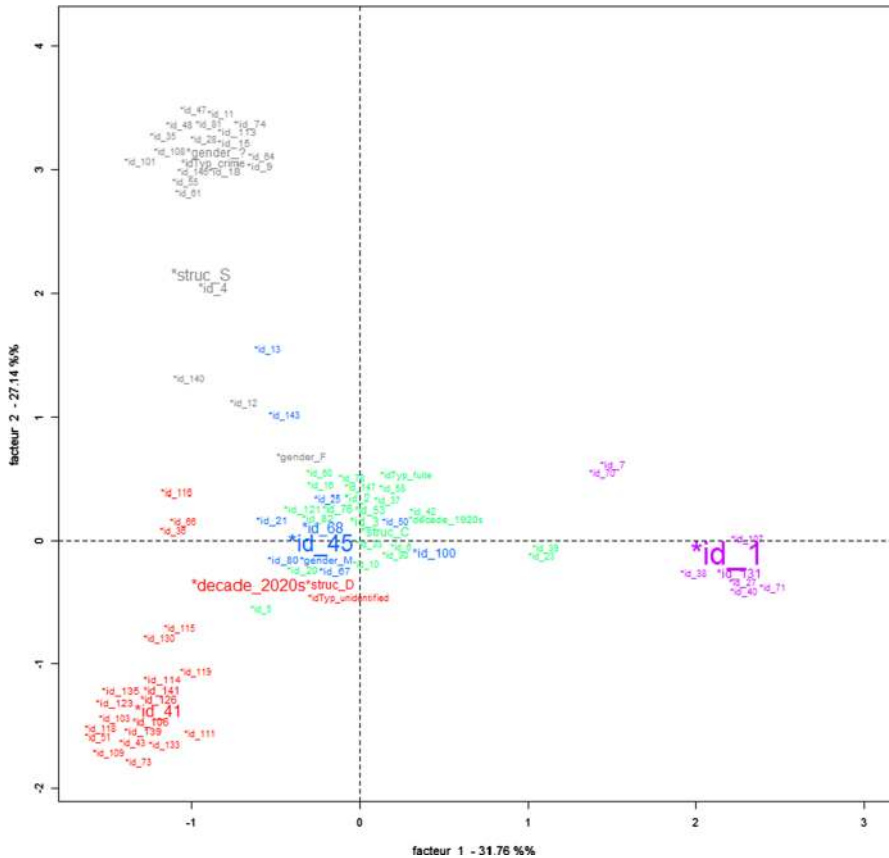
Fig. 3 Factorial Correspondence Analysis (FCA) of the 1920s and 2020s Wikipedia corpora, focus set on the subcategories, by IRaMuTeQ

interpretation, but an autonomous class according to the HDC and FDA algorithms. Another example is the apparition of a well-identified political category. The FDA allows focusing the analyst toward a single narrative which leads to be very long and explain the presence of the class by itself. As its topic is different from the other texts of the corpora, it did not seem relevant to grant it importance, but the length of its content forced the algorithm to conclude otherwise. The joint use of HDC, FDA and SA allows providing an interesting understanding of the corpora. Structural (SA) and content focused (HDC and FDA) algorithms complete each other in order to sustain for each other's part of shadow. Other visualizations such as cloud words, starry graphs or crown pattern (Maurer 2016) could provide additional information. However none of them would answer the main limitation of the textual visualization tools used here. HDC, FDA and SA offer interesting information about a corpus of narrative. The last is represented as a fixed content that is to be autopsied with the best tools possible. Doing so, the visualizations are limited to the synchronic expression of a text. It
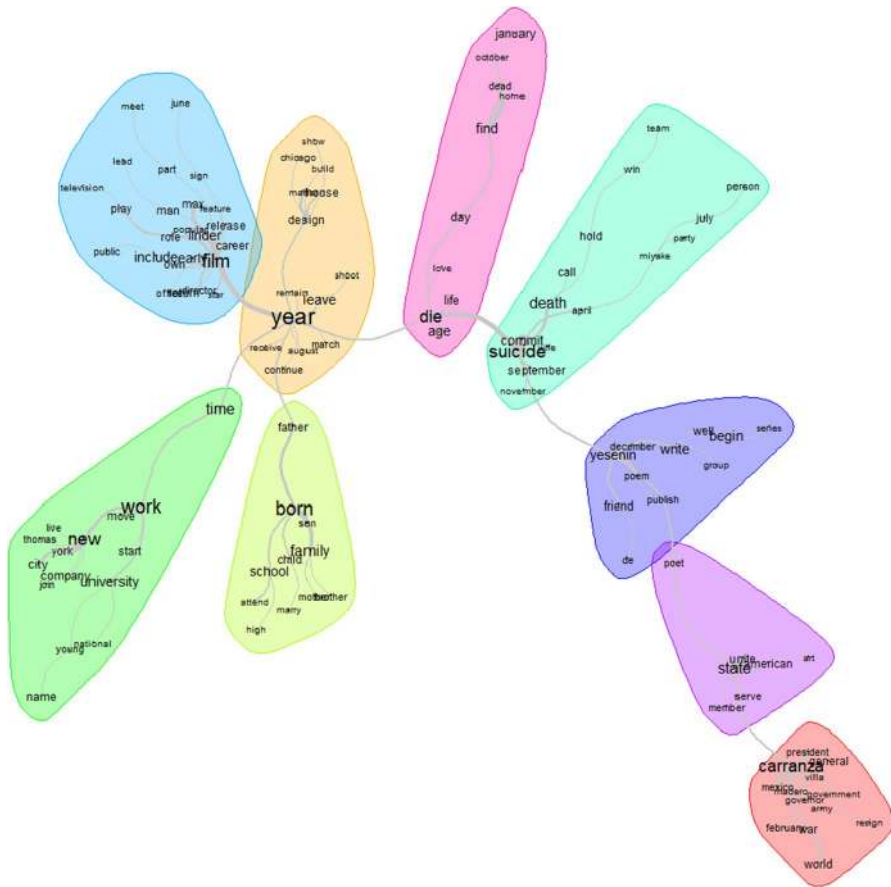
Fig. 4 Similarity Analysis of the 1920s and 2020s Wikipedia corpora, by IRaMuTeQ

appears as a limitation as this study aims to analyze suicidal life stories that are before all diachronic processes. In order to make life-story methods benefit from textual visualization, an algorithm needs to be developed to focus on the changing part of the narrative.

Highway_star: visualizing life-story courses

The Highway_star tool has previously been mentioned for its secondary purpose: easily download corpora of biographies from Wikipedia. Its primary aim is to create textual visualization that emphasizes on the developmental aspect of the narrative. The description of its operation will be followed by its use on the 1920s and 2020s corpora.

Operation

The purpose of the highway_star tool is to use textual statistics to represent a corpus of texts. Unlike previously presented visualizations and methods, the aim is to emphasize the diachronic part of the narrative. Highway_star is suitable to describe oriented narratives, meaning stories that have a beginning, a middle and an end. It can be used as an exploratory assistant in order to identify some points of focus for the qualitative analysis, as a complement of a classical quantitative analysis using for example HDC, FDA and SA or as a way to represent life-story courses. The tool takes as input a corpus of texts. Their number might vary from a few dozen or even less to multiple thousands. It is, however, to be noted that the running time of the software grows exponentially as the size of the corpus and the length of the texts rises. Theoretically, those two parameters can be as high as wished. Empirically, the output is uncertain when we try to compute more than 900 biographies. The output generated by the tool is a Sankey diagram. It shows from the left to the right, the most used terms from the texts and how they are linked to each other. The width of the lines that represent each word and the one that designate the relations between them are respectively proportionate to the frequency of the expression and the intensity of the relationship in between them.

Highway_star's algorithm follows several major steps: from tokenization to the generations of a Sankey Diagram. Examples of their respective impact are presented with the first sentence of the narrative n. 1. It is fed to the algorithm as it directly appears: 'The Carranzas had high ambitions for Venustiano, Carranza remained a Liberal who idolized Benito Juárez' (1). Firstly, the texts are tokenized, meaning that each word is identified and separated from the rest of the text. Said otherwise, while the initial input is each text of the corpus as a whole, after the tokenization, data is shaped in order to be easily recognized by the algorithm: '["The", "Carranzas", "had", "high", "ambitions", "for", "Venustiano", "Carranza", "remained", "a", "Liberal", "who", "idolized", "Benito", "Juárez"]'. This treatment requires special attention regarding punctuation and composed words. It is necessary to dissociate words from the punctuation they are linked to. For example, the expressions 'eat' and 'eat,' have to be identified as similar. In order to achieve this, punctuation is deleted from the database. As focus of the analysis is words, the loss linked to the abandon of punctuation is not severe. However, it is important to take into account that composed words will appear as two different words. For example, expressions such as 'take-off' or 'dry-cleaning' are registered as '["take", "off"]' or '["dry", "cleaning"]'. Being considered as two different words, there is a risque that their relation's strength crushes the more subtle associations of expressions.

Secondly is the lemmatization. Its purpose is to standardize previously identified words. Traditionally, every expression is transformed to its singular—and masculine depending of the language—shape. For example, 'eats' or 'eating' becomes 'eat'. Lemmatization also allows removing stop words. They are the words that do not bring meaning to the text but allow its grammatical construction. For example, keeping words such as 'he', 'a', 'the', makes the analysis more difficult while having few heuristic virtues. At this point, the data set is as follows: '["carranzas", "high",

"ambitions", "venustiano", "carranza", "remained", "liberal", "idolized", "benito", "juárez"]'.

Thirdly, the common stop words are imported from the Python's library Spacy and it is possible to manually add words that are disturbing the analysis. For example, if the topic of the analysis is planes, it might be better to simply consider the words 'take' and 'off' as stop words rather than seeing most relations of the corpus disappear behind the strength of the relation between them.

Fourthly, the part of speech tagging step of the algorithm allows to choose which parts of speech are to be kept. Traditionally, the analysis is run on verbs and nouns, but some specific situations might require a focus on adverbs or adjectives, for example.

It is fifthly needed to identify the most common relations. This is done by using the Pypi library Prefixspan developed by (Jian Pei et al. 2001). For each narrative, the relations between each word are quantified and stored. For example, as the first two words of the text n. 1 are 'carranzas' and 'high' the first line of the dataset stores the information '["carranzas", "high",'1′]', meaning that 'carranzas' is followed by 'high' once. The second line is '["high", "ambitions",'1′]', etc. Once every text has been analyzed, a table concerning the whole corpus is generated. It contains the sum of the relations of every narrative it contains. For example, if there are in total three lines that show a relation between 'high' and 'ambitions', the line of the final table regarding this topic will be: '["high", "ambitions",'3′]', meaning that the relation has been observed three times. As the order of the words are clearly defined ('high' is followed by 'ambitions' and not the other way around), it is possible to identify strings of words more common than others.

In addition to the data frame, the function has two arguments: the number of relations that is to be kept and the length of the string. For starters, let's assume we want the minimum number of relations, which is one. The function will return to the top 10, 100, 1000, etc., most popular relations that imply only two words. For example, 'eat' is followed by 'pie' 56 times through the whole corpus. With its 56 occurrences, it is ranked in the 11th position. It will not appear if we choose to print only the top 10. One limitation of this is the lack of dynamism of the recorded data. For example, if one text contains a hundred times 'eat', 'pie', 'eat', 'pie', etc., it might give to the relation between 'eat' and 'pie' a lot of importance while it is marginal in the corpus. This is the reason why the Prefixspan algorithm allows choosing much longer successions of words. Now, instead of choosing one as the number of relations, let's take one hundred. The relations that are highlighted are not isolated between only two words, they are located within a longer chain of a hundred words which represents to some extent the narration. The limitations here are that if the chain is too long, it ignores the texts that are smaller than its size and that a very long chain might reflect too much the uniqueness of each text, making it impossible to find similarities. The length of the word chain is about finding a middle ground between singularity and comparison.

Finally, it is time to create the visualization. Prefixspan has returned a matrix in which each relation between two words is classified by the number of times it occurs in the corpus. This information is fed to a Sankey Diagram in JavaScript, using the SVG-based charting library Highcharts. Finally, the function returns

two files. The JavaScript contains the data, while the html shows the representation of the corpus. The Highway_star tool is efficient as it allows to quantitatively represents diachronic narrations. It has a few easy-to-use parameters that permits the user to adapt it to the corpus. Can be mentioned the choosing of stop words, either by parts of speech or individually, the lengths of the chain of words and the number of relations that are to be represented in the diagram.

Some methodological limitations can already be mentioned. The most important one is that the algorithm is of structural nature. It analyzes succession of expressions rather than themes, resulting in two weaknesses. First, if adjectives are not eliminated at the lemmatization step, they might stop two nearly identical strings of words to be recognized as such. For example, 'eating a pie' and 'eating a good pie' will not match, as 'good' makes the two chains different. It can be argued that this behavior is not a limitation but a feature of the tool, as the phrases 'eating a pie' and 'eating a good pie' are indeed different and should not be counted as equivalent. The point seems valid. It can, however, be noted, as a possible improvement, that an option allowing taking some flexibility into account would be nice, making it possible to analyze the two sentences as different yet having some common features. The second weakness associated with the structural nature of the tool is that it is highly dependent on the structure of the narrative itself. In the 1920s and 2020s corpora, three types of texts have been identified, presenting life in a chronological order (type C), describing mainly the individual's occupation (type D) and focusing on the suicidal behavior (type S). Trying to find recurrences among stories which begins alike by death or by birth, the Highway_star tool promises to be inefficient if used on the corpora as a whole. It will be necessary to run it on subcorpuses determined by the structure type of the narrative. A secondary limitation relies on the difficulty to analyze conjointly narratives of different sizes. Long texts are prone to long string of words, in order to highlight its dynamicity with accuracy, but it would imply to simply ignore the shorter ones. Conversely, focusing on short strings of words would result in the long narratives to be considered as numerous short texts, which represents an important loss of information. The only solution to this problem seems to build subcorpuses of equivalent size narratives. The Carranza example (1) showed earlier that even classical textual visualizations (HDC, FDA and SA) required a human interpretation to identify the consequences of a disproportionately long narrative among the corpora. Another secondary limitation is that the length of the word strings and the number of relations to be kept are chosen by the analyzer. This induces a potential subjective bias as it makes theoretically possible to produce many visualizations of a single corpus by solely modifying those settings. This point is secondary as few tools prevent by themselves from being misused. More generally, whatever the quantification level of the method, if someone with bad intention voluntarily wishes to skew a study, chances are high that he will succeed. The Highway_star tool makes no exception. Those limitations lead to the conclusion that the Highway_star tool is not to be used by its own, but conjointly with other textual visualization tools and qualitative interpretation. Doing so, it does efficiently complement previous analyses about suicidal biographies.

Visualization[17]

The following visualizations are obtained with Highway_star, using specific parameters. The word string length (str_len) is set to 10 as it appears to be an efficient way of keeping the charts dynamics while not excluding too many content of the narratives. The number of relations represented (rlt_amt) is set to the size of its corresponding subcorpus as it allows taking the various sizes of the last into account. Finally, the following stopwords are manually added in order to keep the representations clear of the noise induced by directly working on narrative sources: 'wer', 'boire', 'sentir', 'avoir'.

A first point is that the representation is heavily dependent on the narrative's structure. The visualization of the chronological biographies (type C) makes it clear that the stories begin with the birth ('born') of an individual in a 'family' and becomes ('became') 'later' something (Fig. 5). The middle of the graph, which represents the middle of the strings of words of the corpora is more confused, meaning that there is more variety in the middle of the narrative. Finally, most of the texts end with an 'early' death ('died'), the last of them occurring 'later' as represented by the yellow line going down and back to connect with the expression. Opposed to the type C structures are the narratives that begins with the suicidal act (type S). Their representation offers two interesting information (Fig. 6). Firstly, the story starts indeed by death ('died') and is mostly composed of marks of affections ('love', 'tribute', 'salute'). Secondly, being very short, those texts tend to be shaped alike as suggests the representation that is only composed of a single branch. The last type of text focuses on the description of the individual occupations (type D). As it owes its integrity to its content rather than its shape, the Highway_star visualization is poorly effective (Fig. 7). Concerning the words highlighted by the algorithm, many of them carry few interesting information by themselves ('also', 'one', 'two'). Regarding the shape of the graph, it is rounder than linear. The lines that go down from 'office' and 'two' never get back up, meaning they connect to the first expression of the visualization: 'also'. Doing so, every word represented is regularly followed and following another one, meaning that what is the beginning for some stories is the end for others. As the type S subcorpus is composed of short texts and the type D one is not appropriate for the Highway_star visualization, the following analysis relies on sub-subcorpora of the type C subcorpus. Two variables are apprehended: decades (Figs. 8 and 9) and gender (Figs. 10 and 11).

A first observation is that the 1920s type C representation (Fig. 8) shows many similarities with the more general type C representation (Fig. 5). The explanation is that the type C subcorpus is mostly composed of 1920s narratives. The relevance of the decade comparison remains as the 2020s type C subcorpus reveals interesting features. On a structural level, the 1920s visualization is the only one among the type C narratives in which death ('died') appears at the beginning of the life

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[17] Note to the editor: every graph of this section is available has an interactive version that could be put online (.html and .js files). The interactive versions of the graph highlight a line or a word and shows the exact value associated to it when hovered on by the mouse.
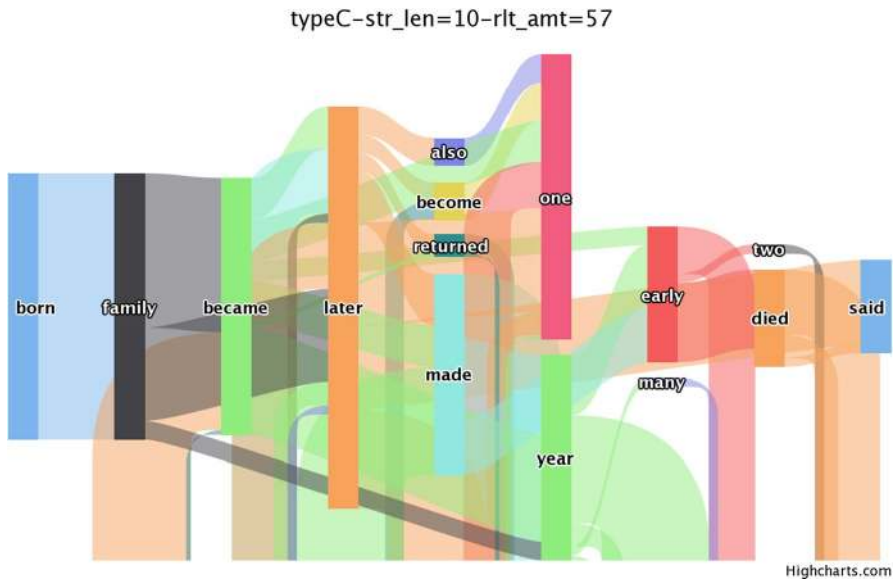
typeC−str_len=10−rlt_amt=57

Fig. 5 Sankey Diagram of the type C subcorpus of the 1920s and 2020s Wikipedia biographies of people who died by suicide

course. It might reflect a Wikipedia editing norm that tends to firstly enunciate birth and death context when there is enough information on the topic. The last implies a certitude that is directly expressed through a declarative sentence, e.g., 'Bing was born in New York City in 1965. Bing died by suicide on June 22, 2020, at the age of 55' (105). Another explanation is that some narratives revolve around the loss of a relative: 'Lisa Marie was born on February 1, 1968. When her father died in August 1977, nine-year-old Presley became joint heir to his estate' (121). Concerning the content of the visualizations, while the 1920s graph shows a classical life development beginning by being 'born' in a 'family' and suffering an 'early' death ('died') after having lived diverse events, the 2020s representations highlight two separate pathways. The top one, more common, is dedicated to the narration of fame as show the words 'legend', 'athlete' or 'life'. On the bottom, the second narrative course seems to focus on various distress factors such as 'emergency', 'loan' or 'rival'. It is finally interesting to see that 'suicide' holds a central position between the two life courses. The Highway_star's representation of Wikipedia biographies allows to identify differences between the decades where the previous analysis seemed to conclude that no major differences were to be observed between the two corpora. While the oldest narratives appear to follow classical pathways starting from birth and finishing in death, the most recent ones seem to highlight two different courses. The first one's focus being on fame and the second on distress.

The gender variable also offers interesting insight into suicidal life courses. Being in majority, men's biographies are characterized by a multiplicity of occupations, the diversity of which only allows generic expressions to appear ('made', 'many', 'later'). It is, however, interesting to note that if the stories unsurprisingly begin by
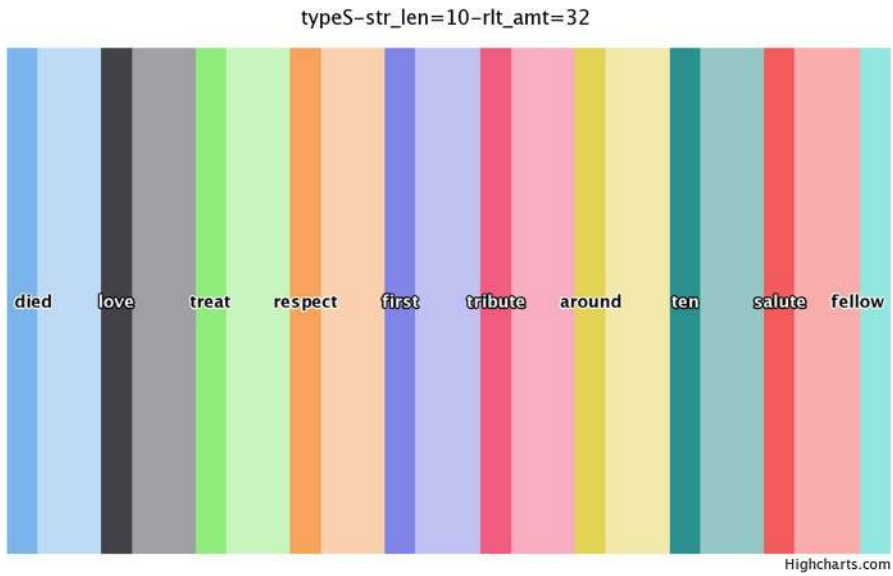
typeS−str_len=10−rlt_amt=32

Fig. 6 Sankey Diagram of the type S subcorpus of the 1920s and 2020s Wikipedia biographies of people who died by suicide
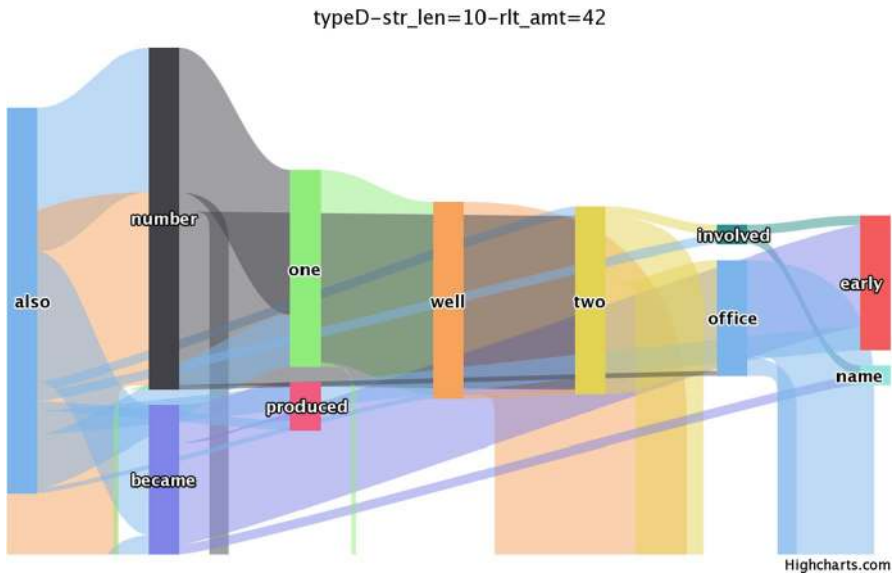
typeD−str_len=10−rlt_amt=42

Fig. 7 Sankey Diagram of the type D subcorpus of the 1920s and 2020s Wikipedia biographies of people who died by suicide
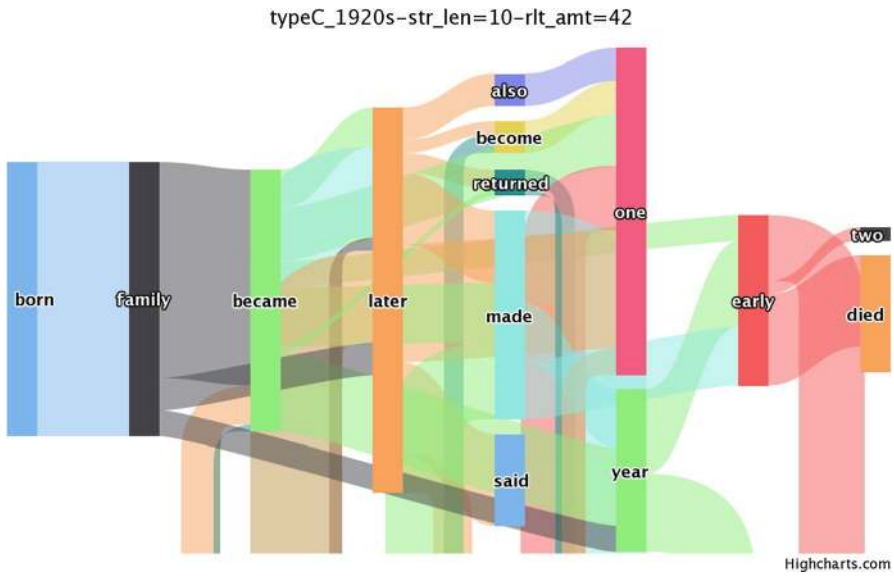
Fig. 8 Sankey Diagram of the type C, decade 1920s, sub-subcorpus of the Wikipedia biographies of people who died by suicide
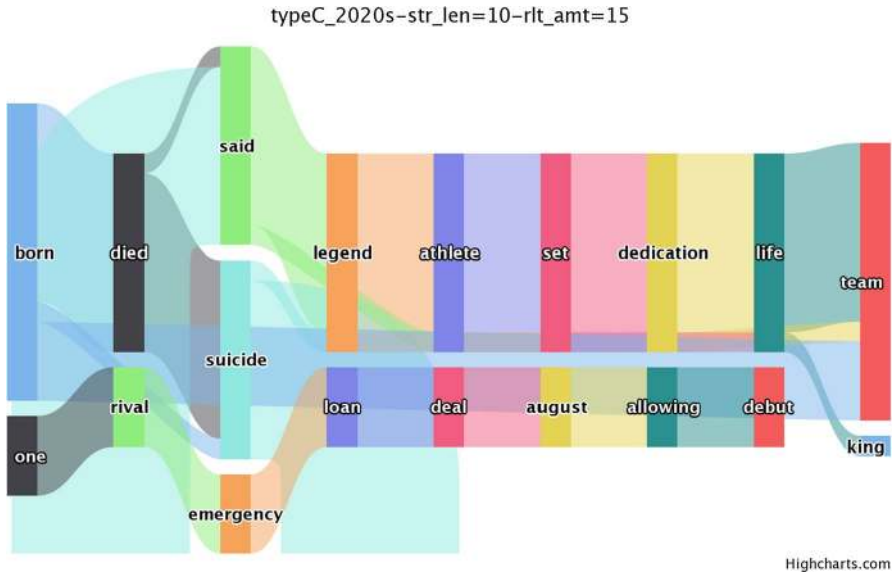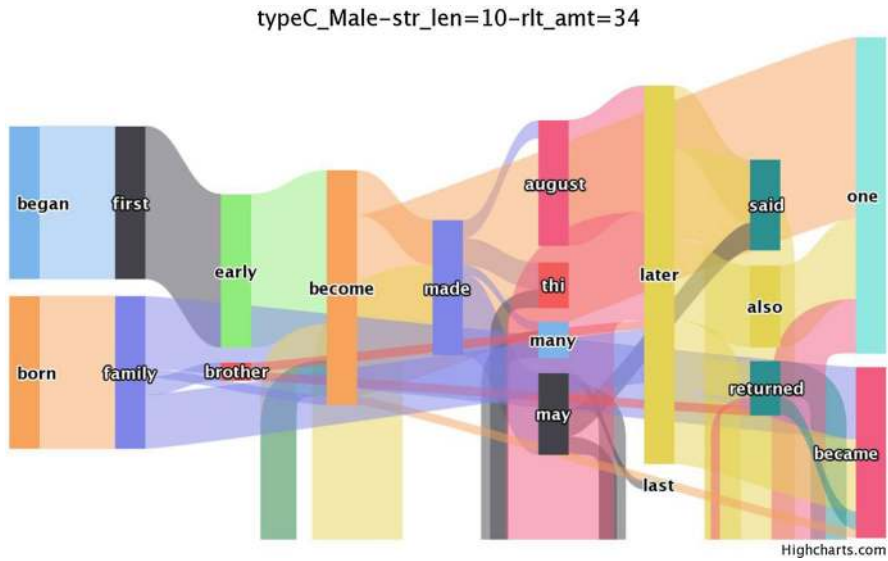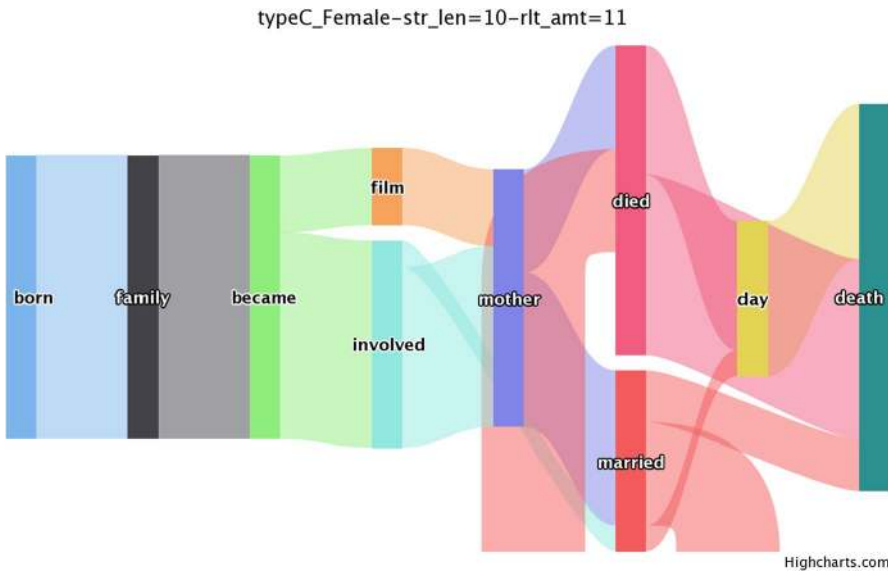

Fig. 9 Sankey Diagram of the type C, decade 2020s, sub-subcorpus of the Wikipedia biographies of people who died by suicide

typeC_Male-str_len=10-rlt_amt=34

Fig. 10 Sankey Diagram of the type C, male gender, sub-subcorpus of the Wikipedia biographies of people who died by suicide

typeC_Female-str_len=10-rlt_amt=11

Fig. 11 Sankey Diagram of the type C, female gender, sub-subcorpus of the Wikipedia biographies of people who died by suicide

being 'born' in a 'family', a second pathway appears. It focuses on the individual accomplishment with words such as 'began', 'first' or 'become'. An example can be found in Kenney's biography which focuses quickly on the individual's successful

plumber career: 'Born to Irish immigrants, Kenney was apprenticed at age 15 to a plumber. In 1891 he began his own plumbing business in Plainfield, New Jersey and gained patents for flush toilets' (17). Controversially, the women's pathway seems to be a caricature of gender stereotypes of the early 20th. The classical pattern of life beginning by being 'born' in a 'family' and ending by 'death' is observed. In between, only one expression refers to fame ('film'), the others being linked to a family register: after being born in a family, a woman becomes ('became') 'involved' and get 'married' as a 'mother'. Another element of comparison is that if the 'family' is common to every narrative, more specific terms are associated with gender. Men have 'brother', while women become 'mother'. No specific relation between women and their father or men and their sisters is observed. A conclusion could be that there are more ways for men to obtain a Wikipedia page, as shows the network density of the representation, rather than for women, illustrated by the linear visualization. More specifically, two semantic fields prevail: death ('death', 'died') and family ('mother', 'married'). A methodological limitation has to be enunciated: the women sub-subcorpus is very small (n = 11). It implies that few relations are represented by the diagram (n = 11) and subsequently that only the most robust relations are depicted. This limitation lowers the range of the conclusion as it is likely that nuances might be found in less common strings of words. It remains interesting to note that the roughest associations depict old-fashioned gender stereotypes.

Transition

More generally, the Highway_star's visualization assesses the efficiency of the handmade structural classification as all subcorpora share common features. By focusing on the chronological stories (type C), general patterns appeared. Individuals tend to be 'born' in a 'family', have a life the content of which differs from one sub-subcorpus to another, and finally meet an 'early' 'death'. Variations, usually find explanations. It is the case of the strange narrative shape of the 2020s visualization into which death appears in second position. The last reflecting an editorial norm for the most recent texts that invites to quickly present birth and death dates before carrying the focus on the individual achievement. The Highway_star tool tends to fulfill its pledges. It depicts from a structural perspective the unfolding of a narrative corpus. Doing so, it represents differences that other, more classical, algorithms failed to identify: an example being the differences between the 1920s and 2020s life stories. The second introducing a narrative scheme that quickly refers to the suicide before presenting more intensively the individual's accomplishments. The algorithm appears to interestingly complete other textual visualization based analysis, especially concerning life-story methods. A major limitation of the Highway_star algorithm is its lack of subtlety. Related to its young age, this point lowers the visualization impact, particularly concerning corpora of very short texts (<10 words). An example being linear suicidal focused narrative visualization (type S, Fig. 6). This point is to be upgraded by further code development. Many trails are considered: take into account relations to distant neighbors, visualize thematic relations rather than structural ones or mathematically optimize the string length and number of

relation values depending on the corpus. On a shorter notice, the quality of the corpus and the efficiency of its preprocessing (tokenization, lemmatization, etc.) play a major role in the relevance of the visual output.

Conclusion

While being an important public health issue, suicide knows few recent qualitative studies. It has been postulated that this was due to the difficulty of finding relevant testimonies and analyze them while remaining coherent to quantitative and hegemonic epidemiological works about the topic. This study has addressed those two points by performing life-story analyses of suicidal narratives with the help of a dedicated informatics tool. The life-story epistemological framework has firstly been presented, opening a discussion that led to the conclusion that those methods had not been applied to suicidal life courses. Explanations related to the methodological difficulties of such an approach have been outlined. A second part has been dedicated to the elaboration of a methodological framework that would remain efficient despite the last. Two corpora composed of the Wikipedia biographies of people who died by suicide have been built using the Highway_star tool, partially developed for this intends. The last step focuses on the analysis of the narratives gathered. It begins by a classical qualitative analysis that follows Fritz Schütze's methodology and is deepened by the use of the textual visualization algorithms of the Hierarchical Descending Classification (HDC), the Factorial Correspondence Analysis (FCA) or Similarity Analysis (SA). They allow classifying the biographies into interesting categories such as death, politic or fame oriented stories. However, the representations picture the content of the corpora as static. The Highway_star tool is used in order to create a visualization of the texts that highlight their diachronic aspects. Doing so, some interesting properties of the corpora are identified. A clear distinction between male and female life courses appears, the last being centered around family-related notions while male stories emphasize life accomplishment and structural differences between the 1920s and the 2020s biographies are revealed. The strong point of this study is the efficient deployment of a data scrapping and texts analyzing tool. The Highway_star software to automatically build two corpora of Wikipedia suicidal biographies and provide interesting information about them, such as the observed differences concerning decades that the other analyses tended to consider as similar. While the 1920s are characterized by a classical life development, beginning by being 'born' in a 'family' and ending with an 'early' death ('died'), the 2020s′ representation shows an early mentioning of death ('died') at the beginning of the narrative and the central role of 'suicide' in between two pathways: explaining the reasons of fame ('legend', 'athlete') and the one of despair ('emergency', 'loan'). As promising as are the last points, the study knows some general limitations. Some are related to its theoretical premises, other to its methodology and the remaining ones to the results.

One of the most important critics of the life-story approach is phrased by Bourdieu in an article whose title is self-explanatory: 'the biographical illusion'[18]

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[18] L'illusion biographique.

(Bourdieu 1986). In his perspective, individuals evolve in a social field. Therefore, it is the understanding of those structures that might explain why a biography takes one shape or another. From Bourdieu's point of view, Bertaux and those who work like him, have succumbed to a 'rhetorical illusion'[19] (Bourdieu 1986, p. 70) that lead them to reverse the causality between life courses and social structures. The limitation of this critic lies behind the definition of the notion of causality, which holds for the defenders of the life story a meaning less formal and more heuristic than for the bourdieusian sociologists (Pires 1989). The interpretative depth of the method seems to have reached even Bourdieu's work, as his study *la misère du monde* published in 1993 (Burrick 2010, p. 17; Bourdieu 2015) follows a similar methodology. Other limitations are published. More nuanced, they also contain some recommendations to improve life-story studies. The main points of Jean-Claude Passeron and Dominique Damamme are discussed. The first one warns of the 'illusion of pan-relevance'[20] (Passeron 1990, p. 6) which consist of believing that one man's life is the 'mirror of the world'[21] (Passeron 1990, p. 9). As one narrative might contain a very high amount of information, a bias that is to be avoided is to confound this quantity of information with its heuristic virtues. In Passeron's opinion, no matter as deep is the description, a single testimony cannot replace neither the knowledge that is to be acquired from the group, or the intensive study of the structures in which the biography occurs. Life-story's aim is to deepen the understanding of collective behavior. It does not suffice to itself to understand a social situation but can enrich a sociological analysis. Dominque Damamme perspective follows the one of Passeron. Like the last, he recognizes the interest of the life stories, but warns against misuses. In his opinion, life stories might take two shapes, one of them being a 'great illusion'[22] (Damamme 1994). Those biographies are qualified of 'monadics' and highlight the uniqueness of the narrative, letting the door open to Passeron's 'illusion of pan-relevance'. Damamme's perspective, to be sociological, a life story must be 'relational',[23] meaning that the focus must be set to the relation between the volunteer's life and its social environment, but most importantly, the social structures in which he lives (Damamme 1994, p. 183).

Some methodological limitations must be exposed in order to clarify the study's range. Firstly, and more broadly than gender and decade of death, many quantitative information could have been retrieved in order to create more diverse subcategories. Season of death (Ajdacic-Gross et al. 2003), physical (Filiberti et al. 2001)

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[19] Illusion rhétorique.

[20] L'illusion de la pan-pertinence.

[21] Homunculus mundus: une vie d'homme, c'est le "miroir du monde".

[22] From the title of his article: 'Grandes illusions et récits de vie' ('Great illusions and life stories'). It might be noted that all the authors that have been mentioned here criticizing the life-story method use the same specific word of 'illusion'. This is a maybe how limitations were phrased in the late 1980s, or maybe this shows a certain interest in the idea of illusion from the quantitative French sociologist of the time.

[23] 'Si on ne peut donc attribuer au biographique des propriétés consubstantielles de décontextualisation ou une logique d'individualisation, reste que les biographies qu'on qualifiera de relationnelles par opposition aux biographies monadiques, pour marquer l'attention qu'elles portent aux interdépendances, sont de loin les plus rares.'.

and psychological (Nock et al. 2009) diseases, childhood adversity (Beautrais 2001; Bruffaerts et al. 2010; Björkenstam et al. 2017) or even living near a charcoal powerplant (Liu et al. 2007) are phenomenon that have been statistically identified to be associated with suicidal behavior. Each of them, and the many others that have not been mentioned, could have been promising subcategories in order to raise the specificity of the corpora. However, the list is virtually endless as any social phenomenon is likely to be linked to some extent with a suicidal behavior. The two selected criteria allow promising comparison between suicides that occurred a century apart from the others while offering an imperfect, but efficient, way to roughly estimate the representativeness of the corpora. Secondly, corpora only take into account the biographies of people famous enough for having a Wikipedia page. It implies a bias that has been quantitatively observed through the over-representation of males in the 1920s corpus and has every chance to have a qualitative incidence. Relying on the postulate that an average famous individual's life differs from the common everyday life (Goffman 1990; Schütz 2010), it seems likely that its death also differs. The present work offers no solution to this problem, except underlying that it more specifically studies famous people's suicide rather than suicide per se. A slightly different methodology could be used in future works in order to avoid this reef, by analyzing the public content of social networks rather than the one of an encyclopedia. Other ethical, methodological and technical limitations would then appear, making it a topic different of the one considered here. Thirdly, regarding the life-story ethnosociological method, and more specifically (Bertaux 2003)'s theorization, using already written biographies deprives the analysis of a critical stance toward the production of the narratives. It implies two limitations. The first one is that there is few, if none, guarantees that the narratives are subjectively true (Berger and Luckmann 1990), meaning that it might not reflect the individual feelings and opinions about his own life. This point is counterbalanced by a high trust into the objective truth of the biographies, due to the pair-validation and source-quoting editorial politic of Wikipedia. The second one is that the method is stepping away from the '*ethno'* dimension of the life story, in order to get closer to its '*sociological'* part. Justifying the use of Schütze's theoretical framework rather than Bertaux's one.

A final limitation comes from the restrained heuristic value of its finding. No new knowledge about suicide is specifically identified. Providing some would have been too ambitious, especially concerning a field or research that already counted more than 4000 studies in the 1930s (Baechler 2009, p. 17). As a qualitative study, the point of this work is to offer a new perspective about a statistically well-known phenomenon, rather than 'discovering new properties'. Another general limitation comes from the corpora. As biographies are gathered from Wikipedia, individuals have to be famous in order to be taken into account. It implies a selection bias, the discussion of which led to the conclusion that it was a coherent price to pay in order to study suicidal narratives. However, it also implied that the textual visualizations simultaneously represent two phenomenon: a trajectory toward fame and another one that ends with suicide. The limitation comes from the fact there is no way to distinguish the two, meaning that some points of the analysis could have been misinterpreted as related to one while being linked to the other. An exception being the representation of the 2020s corpus which highlights both trajectories (Fig. 9).

Finally, concerning the Highway_star tool itself, it appears efficient but lacks of subtlety and heavily depends on the shape of the narrative it is applied to. This point can be managed by paying special attention to the corpus's structure, but deserves to be mentioned as it is a weakness as well as the mold of promising improvement clues such as taking into account lexical content or allowing more flexibility when identifying word strings.

Declarations

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