

Exploring the Complexities of Bioethical Discourse. Primate Cloning in the Press¹

Abstract: Among bioethical themes at the centre of public debate, one of the most sensitive is cloning, which has been controversial since its official appearance on the scene in the 1990s. The debate on the practice and its possible future application to humans has never ceased since Dolly the sheep was first born in 1996. It gathered new momentum when in late January 2018 Chinese researchers announced that they had successfully cloned two macaque monkeys applying a perfected version of the technique originally used to create Dolly. A barrier had been broken, and inevitably a whole series of ethical concerns were raised.

This article looks at the coverage of the 2018 monkey cloning success in the daily press worldwide, and at the discursive procedures used to illustrate its significance, including the popularisation strategies deployed. The focus of the analysis is on ethical implications, with special regard to animal testing ethics and to the possible extension of the technique to humans.

Keywords: *bioethics, ethics discourse, human cloning, monkey cloning, popularisation*

1. Introduction

Among bioethical themes at the centre of public debate, one of the most sensitive is cloning, which has been controversial since its official appearance on the scene in the 1990s. In this connection, it is impossible to overstate the importance of the role of the media in disseminating information about the technical aspects of bioethically relevant scientific advances, their viability and potential developments, since popularised knowledge weighs heavily on how people conceptualise issues and form an opinion about the ethical admissibility and lawfulness of their applications.

As far as cloning is concerned, the debate on the practice and its possible future application to humans has never ceased since Dolly the sheep was first born in 1996. It gathered new momentum when in late January 2018 Chinese researchers announced that they had successfully cloned two macaque monkeys applying a perfected version of the technique originally used to create Dolly. A barrier had been broken, and inevitably a whole series of ethical concerns were raised.

This article looks at the coverage of the 2018 monkey cloning success in the daily press worldwide, and at the discursive procedures used to illustrate its significance, including the popularisation strategies deployed. The focus of the analysis is on ethical implications, with special regard to animal testing ethics and to the possible extension of the technique to humans.

¹ This study contributes to the national research programme “Knowledge dissemination across media in English: continuity and change in discourse strategies, ideologies, and epistemologies”, financed by the Italian Ministry of Education, University and Research for 2017-2019 (nr. 2015TJ8ZAS).

2. Background

As Temmerman makes clear in an essay that questions the myth of the univocity of technical terms,² ‘cloning’ is one of those technical words that do not have a stable meaning. Originally introduced in 1903 to refer to a horticultural practice, it has in time extended and shifted its meaning to refer to various procedures of cell manipulation to obtain identical copies.³ The meaning of this term relied on in the articles analysed here is equivalent to ‘somatic cell nuclear transfer’ (SCNT), in which “the nucleus from a somatic cell (an ordinary body cell) of an organism is inserted into the de-nucleated egg of another (female) member of the same species ... and triggered into developing an embryo”.⁴ In some cases where it is specified, it may refer to the production of clones by ‘embryo splitting’ or ‘twinning’, i.e. by splitting apart an embryo, as happens naturally to produce identical twins, a simpler method, which however produces a more limited number of offspring. In connection with the definition of ‘cloning’, a further distinction needs to be made between reproductive cloning, i.e. “the use of SCNT to produce human embryos to implant into the wombs of women (which) will produce human babies with genome identical to the nucleus donor”, and ‘therapeutic cloning’, i.e. “the use of SCNT to produce human embryos genetically identical to the nucleus donor (which) are then used for research of for the harvesting of stem cells, then destroyed” (96). Although also the latter procedure may lend itself to ethical reserves, the debate on the ethical aspects of the practice, including the likelihood of human cloning, has mainly focused on reproductive cloning.

Immediately after Dolly the sheep’s birth various books were published on the theme of the ethics of human cloning. Suffice it to mention two of them which represent the main trends in the literature ever since, *Human Cloning* by Humber and Almeder,⁵ collecting some essays that take a stance in favour of human cloning, refuting sophisticatedly all arguments against it, and *The Ethics of Human Cloning* by Kass and Wilson,⁶ which, on the contrary, argues in favour of a limitation or an outright ban on all forms of human cloning, at least until more efficient and safer procedures are found. Since then, a rich literature on human cloning has been published, with a recurrence of the two opposite stances, from different points of view (medical, ethical, social, etc.). Instead, within the context of an otherwise immense literature on ethical issues in animal testing, much less attention has been given specifically to the impact of cloning on animals, which has been dealt with in isolated book chapters, e.g. in Panno’s *Animal Cloning*,⁷ or in scientific articles.⁸

An important element to be considered is that human cloning is legally banned in many countries of the world, with various degrees of strictness, i.e. in some cases extending also to therapeutic

² See Rita Temmerman, “Questioning the Univocity Ideal”, *Hermes Journal of Linguistics*, 18 (1997), 68-77.

³ Temmerman’s essay features a detailed discussion of the evolution of the meaning of the word ‘cloning’ in time.

⁴ Marianne Talbot, *Bioethics: An Introduction* (Cambridge: Cambridge U.P., 2012), 95.

⁵ James M. Humber and Robert Almeder, eds., *Human Cloning* (Totowa: Humana Press, 1998).

⁶ Leon R. Kass and James K. Wilson, *The Ethics of Human Cloning* (Washington: Aei Press, 1998).

⁷ Joseph Panno, *Animal Cloning: The Science of Nuclear Transfer* (New York: Facts on File, 2005), 66-73.

⁸ See for instance Rudolph Jaenisch, “Human Cloning: The Science and Ethics of Nuclear Transplantation”, *New England Journal of Medicine*, 351 (December 30, 2004), 2787-2791.

cloning. In March 2005 the United Nations issued a non-binding *Declaration on Human Cloning*,⁹ calling upon all member states “to prohibit all forms of human cloning inasmuch as they are incompatible with human dignity and the protection of human life”, inviting all governments to take relevant measures. So far, to my knowledge no studies have been published on the linguistic and discursive representation of ethical issues in cloning research.

2.1 *Materials and method*

This study is based on the analysis of a corpus of 154 news items and editorials downloaded from Lexis Nexis, which have been retrieved limiting the search to a specified date range comprising thirteen days after the announcement that two macaques had been generated through cloning (23 January to 4 February 2018) and using as search words ‘clon* + monkey*’. It includes print and online newspaper articles (news and editorials), as well as some news wires and journalists’ blog posts, published in various countries of the world (Europe, United States, Canada, Australia, Middle East, China) in the days immediately after the announcement of the breakthrough, among them different editions of some English-language Chinese outlets, mainly newspapers aimed at an international or area-specific public (*China Daily Africa*, *China Daily US* edition). The corpus comprises 97,814 words, 154 texts, each featuring from 376 to 1,305 words, with a STTR of 41,99.

This study also considers, for obvious comparative purposes, the scientific research article that announced the breakthrough,¹⁰ which can be seen as the source, or at least, the main reference, of the information set out in the popularising articles.

In terms of methodology, the main frame of reference is in discourse analysis¹¹ and Critical Discourse Analysis,¹² and starts from the assumption that in the press discourse has often the more or less deliberate effect of orienting the audience’s views about facts reported in news articles, especially when ‘sensitive’ topics are being dealt with.¹³

Reference is also made to research on popularization discourse, and in particular on the strategies used to make scientific knowledge accessible to the layman. Calsamiglia and van Dijk¹⁴ describe five such strategies that they collectively see as forms of ‘explanation’: ‘denomination’, often realised with recourse to expressions like ‘denominated’, ‘called’, ‘known as’, ‘so-called’, ‘technically called’, etc.; ‘definition’, often in the form of ‘genus proximum et differentia specifica’, introduced by an apposition and a relative clause, or a relative clause only; ‘reformulation’ or ‘paraphrase’, given in the form of an apposition, or in brackets, or introduced by expressions like ‘that is or in other words’;

⁹ See digitallibrary.un.org.

¹⁰ Zhen Liu et al., “Cloning of Macaque Monkeys by Somatic Cell Nuclear Transfer”, *CELL*, 172 (February 2018), 881-887.

¹¹ See for example Jan Blommaert, *Discourse: A Critical Introduction* (Cambridge: Cambridge U.P., 2005); Gillian Brown and George Yule, *Discourse Analysis* (Cambridge: Cambridge U.P., 1983).

¹² See for example Norman Fairclough, *Critical Discourse Analysis: The Critical Study of Language* (Harlow: Longman, 1995.); Ruth Wodak and Michael Meyer, eds., *Methods of Critical Discourse Analysis* (London: Sage, 2001).

¹³ See, among others, Teun A van Dijk, *News as Discourse* (Hillsdale: Lawrence Erlbaum Ass. Publishers, 1988); Roger Fowler, *Language in the News: Discourse and Ideology in the Press* (London: Routledge, 1991).

¹⁴ Helena Calsamiglia and Teun A. van Dijk, “Popularization Discourse and Knowledge about the Genome”, *Discourse & Society*, 15.4 (2004), 369-389. Special issue *Genetic and Genomic Discourses at the Dawn of the 21st Century*, guest-edited by Brigitte Nerlich, Robert Dingwall, Paul Martin.

‘analogy’ or ‘association’, consisting of similes, often introduced by expressions like ‘similar to’, ‘like’, ‘not different from’, ‘the same as’, or metaphors; ‘generalisation’ clarifying the character of an object or action by presenting it within the context of all or most members of a set. Garzone¹⁵ identified a further recurrent strategy, ‘explication’ proper, whereby the reader is offered information that enriches his/her knowledge of the subject matter treated.

The popularisation process involves not only a semiotic reorganisation at the communicative level and recourse to explanatory strategies, but also a degree of cognitive restructuring. Transmitting scientific knowledge and transforming “objects and states of knowledge of the world of science into the *objects of media discourse*”¹⁶ entails an overall process of ‘explanation’, but above all a proposal for their re-interpretation in terms of social knowledge.¹⁷ In the case of the articles on monkey cloning analysed here, the contents of the highly dense and highly complex scientific text in which the breakthrough was announced, essentially focusing on technical aspects and procedures, are selectively reduced and recontextualised as a description of the successful experiment, and integrated with considerations about its scientific and social significance. In this respect a useful notion is that of entextualisation, originally introduced in anthropology¹⁸ to refer to the extraction of meaning from one discourse and the consequent insertion of that meaning into another discourse through a process of de-contextualisation or ‘decentering’ and its ‘re-centering’ in another context.¹⁹ As we shall see, in the case at hand the original scientific article announcing the success of the cloning experiment is far too complex for any part of it to be reused, albeit simplified. Rather there is a tendency to incorporate in the text and re-center various declarations and comments made by experts. In actual fact, citation is the most obvious form of incorporation of others’ discourse into one’s discourse and is widely relied on in journalism and in popularising texts. In particular, when the scientific information given in an article is especially complex, and the writer is not an expert, citation may serve a double purpose:²⁰ it guarantees effectiveness in expression and credibility, conferring authority and legitimacy on what is being said; at the same time attribution to an expert absolves the journalist from responsibility for the accuracy and truthfulness of the contents which, instead, ‘averral’ would have entrusted him/her.²¹ As will be seen shortly, in the articles under investigation here, citation is used intensively, not so much to guarantee accuracy and authoritativeness to information, but rather as a way to express qualified views about the controversial issues being discussed.

This study is essentially qualitative, also on account of the relatively small size of the corpus

¹⁵ Giuliana Garzone, *Perspectives on ESP and Popularization* (Milano: CUEM, 2006); “News Production and Scientific Knowledge: Exploring Popularization as a Process”, in Giuditta Caliendo and Giancarmine Bongo, eds., *The Language of Popularization: Theoretical and Descriptive Models* (Bern: Peter Lang, 2015); *Specialized Communication and Popularization in English* (Roma: Carocci, 2020).

¹⁶ Sophie Moirand, “Communicative and Cognitive Dimensions of Discourse on Science in the French Mass Media”, *Discourse Studies*, 5.2 (2003), 175-206, 183, emphasis in the original.

¹⁷ *Ibid.*, 191.

¹⁸ Michael Silverstein and Greg Urban, “The Natural History of Discourse”, in Michael Silverstein and Greg Urban, eds., *Natural Histories of Discourse* (Chicago: Chicago U.P., 1996), 1-17.

¹⁹ *Ibid.*, 15.

²⁰ Helena Calsamiglia and Carmen López Ferrero, “Role and Position of Scientific Voices: Reported Speech in the Media”, *Discourse Studies*, 5.2 (2003), 147-173.

²¹ John Sinclair, “Fictional Worlds”, in Michael Coulthard, ed., *Talking about Text: Studies Presented to David Brazil on His Retirement* (Birmingham: University of Birmingham, 1986), 43-60.

investigated (about 100,000 words). However, corpus linguistics tools²² are also used to identify salient aspects, while avoiding the subjectivity and arbitrariness in discourse interpretation of which the eminently qualitative approach of CDA has been accused.²³

3. Analysis

The analysis will start with a brief discussion of the peculiar features of the research article that announced the successful cloning of the two monkeys and will go on to focus on the corpus of newspaper articles. The scientific research article announcing the breakthrough was published in the Journal *Cell*, a prestigious journal in the area of cellular biology with an impact factor of 31.398 (updated to 2017). The article, signed by Liu et al., a group of researchers from the Chinese Academy of Science, dated 8 February 2018 but published online in advance on 22 January,²⁴ focuses on the method used to clone non-human primates successfully for the first time. This technical focus is evident from its very opening:

- (1) In this study, we have successfully cloned cynomolgus monkeys (*Macaca fascicularis*) by somatic cell nuclear transfer (SCNT). We found that injection of H3K9me3 demethylase *Kdm4dmRN A* and treatment with histone deacetylase inhibitor trichostatin A at one-cell stage following SCNT greatly improved blastocyst development and pregnancy rate of transplanted SCNT embryos in surrogate monkeys.²⁵

The whole article discusses technical problems and describes procedures and solution, in highly technical terms with a very high lexical density. For instance, in only ten randomly chosen lines in the paper the following terms were found: ‘polarized-light imaging’, ‘spindle-chromosome complex oocyte’, ‘viral envelope’, ‘hemagglutinin’, ‘perivitelline space’, ‘fibroblasts’, ‘pronucleus’, ‘ionomycin’, ‘6-dimethylaminopurine’, ‘I/D activated SCNT embryos’, ‘blastocysts’.

Only in the very last two sentences is there a brief comment indicating the ultimate purpose of the research, i.e. the advancement of research on human diseases:

- (2) This is particularly relevant for developing monkey models for human diseases with defined genetic defects that could be used for studying disease mechanisms and testing potential therapeutic treatments. Basic studies on the genetic basis of primate-specific traits will find genetically uniform clones of non-human primates a useful laboratory animal model.

This statement, which is used also as an opening for the Summary (i.e. the abstract) preceding the article, defines clearly the aims of the research in terms of medical advancement, thus giving the lie to

²² Mike Scott, *WordSmith Tools, version 6* (Liverpool: Lexical Analysis Software, 2012).

²³ Giuliana Garzone and Francesca Santulli, “What Can Corpus Linguistics Do for Critical Discourse Analysis?”, in Alan Partington, John Morley, and Louann Haarman (eds), *Corpora and Discourse* (Bern: Peter Lang, 2004), 351-368. Gerlinde Hardt-Mautner, “Checks and Balances: How Corpus Linguistics Can Contribute to CDA”, in Ruth Wodak and Michael Meyer (eds), *Methods of Critical Discourse Analysis* (London: Sage, 2009), 122-143.

²⁴ Zhen Liu et al., “Cloning of Macaque Monkeys”.

²⁵ Italics in the original.

anyone who may think the research has other purposes, e.g. human cloning.

Attention will be now turned to popularising articles included in the corpus. An even cursory look at their headlines immediately identifies an important difference in approach between Western and Chinese news outlets. Headlines of Western news outlets, and in particular those of the British quality press, tend to emphasise British scientists' paternity of the technique applied, with their expertise thematised as the agent of the breakthrough, while Chinese researchers are not even mentioned:

(3) Science behind Dolly the Sheep creates monkey clones.²⁶

(4) Dolly science creates monkey clones.²⁷

Thus, in the British press apparently purely informative headlines are used respectively to question the 'real' Chinese primacy in this research area and to reaffirm British or, better, Western scientific hegemony.

Also in the body text, many articles, and especially those coming from British outlets, tend to give the announcement in non-specific terms, as an important step forward for science in general:

(5) The birth of two baby monkeys created *through the same procedure used to make Dolly the sheep* could take science closer towards cloning humans, according to experts.²⁸

This is in sharp contrast with the Chinese press. Unsurprisingly, all Chinese media, i.e. various international editions of *China Daily*, *The Global Times* – a tabloid newspaper published under the auspices of the *People's Daily* – and wires of the Xinhua General News Service (the official state-run press agency of the People's Republic of China) prefer to have 'China' or 'Chinese researchers' in subject (and Theme) position in the headlines, thus underlining their country's merit in the discovery:

(6) China says it has cloned a monkey using non-reproductive cells, a 1st.²⁹

(7) Chinese scientists clone two monkeys.³⁰

(8) Behind the research: how Chinese scientists are first to clone macaques.³¹

Quite meaningfully in these headlines no mention is made of the fact that the method used by Chinese scientists is an improved version of the technique originally devised by the British scientists

²⁶ Oliver Moody, "Science behind Dolly the Sheep creates monkey clones", *The Times* (London, 24/01/2018), www.thetimes.co.uk (unless otherwise indicated, all websites were last visited on 10 August 2019).

²⁷ Ibid.

²⁸ Ibid., emphasis added.

²⁹ Zhang Zhihao, "China Says It Has Cloned a Monkey Using Non-reproductive Cells", *China Daily* (25/01/2018), www.chinadaily.com.cn.

³⁰ Chen Shasha and Shan Jie, "Chinese Scientists Clone Two Monkeys", *Global Times* (China, 26/01/2019), www.globaltimes.cn.

³¹ Liu Wei and Luo Zhen, "Behind the Research: How Chinese Scientists Are First to Clone Macaques", *Xinhuanet* (30/01/2018), www.xinhuanet.com.

who created Dolly the sheep.

Similarly, in the body text, emphasis is given to the paternity of the successful experiment, not only referring to the scientists who carried it out, but attributing it to the whole country:

(9) *China became the first country to clone a monkey using non-reproductive cells.*³²

The text clearly asserts the primacy of China in cloning research, emphasising the positive outcomes that may derive from the breakthrough, even if in some of the articles produced in China acknowledgement of the Dolly precedent is given, although without prominence. The elements that have emerged so far in this brief analysis indicate that in reporting on the Chinese breakthrough in non-human primate cloning each country attempts to attribute itself the most important role in the development of the procedure that has made it possible.

3.1 *Popularising strategies*

As far as the overall structure of the articles is concerned, after the lead, providing the most essential information, the next few paragraphs tend to follow a narrative pattern along two different lines: the history of primate cloning research, starting from the birth of Dolly the sheep, and the different stages of the current study that has led to the birth of the two macaques, often with an account of the trial and error process experienced along the path to the final positive outcome. These narratives are usually interspersed with quotations in the form of indirect or, more often, indirect citations.

In linguistic and cognitive terms, the topic is hardly accessible to the layman, as emerged clearly in the brief analysis put forth in §3. Hence the need to make recourse to popularising strategies, and in particular to the explanation strategies introduced in §2.1 above, although their frequency of use is somewhat lower than one might expect, and above all limited in the range of strategies enacted, with a prevalence of denomination and definition.

For instance, in terms of strategies retrievable by means of computer routines, a few similes can be identified, nine in all, introduced by ‘similar’ to illustrate the technique used to clone the two monkeys (e.g. “*similar to the technology used to create sheep Dolly*”; “a monkey created by splitting an eight-cell embryo into two, *similar to the way twins are normally formed*”) and ten introduced by ‘like’ (e.g. “*like when you erase the contents of a hard drive before adding new data*”, to describe epigenetic reprogramming).³³

For denominations, there are as many as 44 entries of ‘called’ with a popularising purpose, for instance: “an early embryonic stage *called a blastocyst*”, “a simpler method *called embryo splitting*”, and 19 of ‘known’ with this meaning (“a process *known as epigenetics*”, “a different technique *known as somatic cell nuclear transfer*”). Denominations are often accompanied by definitions, a combination that both provides readers with the designations of technical notions and makes them aware of what such designations refer to (e.g. “a technique in which”; “fibroblasts, which is a type of fetal cells”).

³² Zhihao, “China says it has cloned a monkey...”

³³ “It’s a Horror Show: Peta about Cloning Monkeys in China”, *CE Noticias Financieras English* (25/01/2018).

Relatively less frequent are exemplifications, with ‘for example’ appearing only 12 times (e.g. “*for example*, skin fibroblasts support epidermal cells”; “*for example*, mice and cats are easy to clone”) and paraphrases, with ‘that is’ used only seven times, for example:

- (10) The primates, two long-tailed macaques, were created by a nuclear transfer of somatic cells, *that is*, from cells of the tissue of an adult macaque primate, in a procedure carried out at the Neuroscience Institute of the Chinese Academy of Sciences in Shanghai (China).³⁴

In addition to explicit popularisation strategies, other communicative options are deployed, first and foremost reduction and simplification, which involve re-elaboration and tailoring to the needs and abilities of the ‘particular’ audience (drawing on Perelman/Olbrechts-Tyteca)³⁵ to which it is addressed.

This emerges clearly if the explanation of the procedure and the aspects that determined its success – treatment with two specific epigenetic modulators and the use of fetal, rather than adult, fibroblasts – as set out in the original paper (see example (1) above) is compared with their description in any of the news articles.

While in some of the articles the explanation, however simplified, is adequate, naming and shortly describing the successful innovative procedures, followed by the specification that fetal cells have been used, in some other articles, the account of the experiment is greatly simplified, with very summary descriptions of the SCNT technique and no mention of the improvements that have made the experiment successful, as in the following case, where the two sentences quoted here below are the only technical information given:

- (11) The process involves removing the nucleus from a healthy egg, and replacing it with another nucleus from another type of body cell. The clone becomes the same as the creature that donated the replacement nucleus.³⁶

Although such an oversimplification may be justified by the fact that the article intends to focus on other aspects, e.g. the controversial issues associated with cloning, and in particular the possibility of human cloning and animal testing objections, the description of the procedure is so poor that makes it impossible for the reader to understand the real nature of the breakthrough.

This is an evident case of misinformation or – as Bell³⁷ called it, ‘misreporting’. Of course, the operations of deletion, simplification, synthetisation and (re-)construction of knowledge necessary in the drafting of popular science articles are potential sources of alteration and distortion, so is the indispensable change in register, but popularization as a process ought to be subject to some kind of ethics that protects the lay public from misinformation and provides it with the elements necessary to form an opinion, above all when the subject matter is very sensitive, as in the case of primate cloning.

³⁴ Ibid.

³⁵ Chaïm Perelman and Lucie Olbrechts-Tyteca, *The New Rhetoric: A Treatise on Argumentation* [1958], trans. by John Wilkinson and Purcell Weaver (Notre Dame, London: University of Notre Dame Press, 1969), 31.

³⁶ Nick Whigham, “Chimps off the Old Block”, *The Daily Telegraph* (Australia), 26/01/2018.

³⁷ Allan Bell, *The Language of News Media* (Oxford: Polity, 1991), 216.

4. Representation of Problems and Ethical Issues

Attention will now shift to how controversial ethically relevant issues are dealt with in the articles. Virtually all the texts included in the corpus do recognise that the successful experiment and the availability of viable techniques to clone primates is not unproblematic.

As a quote cited in a *Telegraph* article states categorically:

- (12) Prof Darren Griffin, professor of genetics at the University of Kent, said: “The first report of cloning of a non-human primate will undoubtedly raise a series of ethical concerns, with critics evoking the slippery slope argument of this being one step closer to human cloning”³⁸

The journalist uses this quote by a real expert to highlight the controversial character of the breakthrough: recourse to the adverbial of stance ‘undoubtedly’ reinforces the idea that the new successful primate cloning procedure determines concern, the reference to *critics* points out by presupposition that there have been negative views and the observation on the ‘slippery slope argument’ clarifies the kind of reservations that detractors express.

This approach is recurrent in the corpus, with texts frequently featuring evaluative expressions articulating an attitude towards cloning, in particular ‘concern*’ (62 hits), ‘question*’ (64 hits), ‘dilemma*’ (17 hits) and ‘fear*’ (49 hits). All these words occur frequently in collocation with the verbs ‘raise’, ‘prompt’, and ‘address’. In particular, with ‘raise’ and ‘prompt’ they tend to occur in object position, with the subject being a noun or phrase referring to the successful experiment, like ‘the step’, ‘the research’, ‘the work’, ‘the clone breakthrough’, or a full periphrasis (e.g. “The first report of cloning of a non-human primate”, “The birth of the now six and eight-week old macaque babies”, etc.). See the following examples:

- (13) But while the success marks a breakthrough in cloning research, it also *raises major ethical questions*.³⁹

- (14) The research has *raised some serious ethical concerns* that this could lead to the cloning of humans.⁴⁰

- (15) Whole labs full of genetically identical macaques can now be created – *prompting fears* about the ramifications of humans being replicated.⁴¹

The collocation ‘rais*’ + ‘concern*’ is the most frequent (19 times), with ‘concern*’ in various positions (R1, R2, R4 – as in the example above –, R5, i.e. one, two, four or five ‘slots’ away to the right of the verb form).

³⁸ Sarah Knapton and Vedika Bahl, “First Monkeys Cloned in Historic Breakthrough: Could Humans Be Next?”, *The Telegraph* (24/01/2018), www.telegraph.co.uk.

³⁹ Alexandra Richards, “Two Monkeys Are World’s First Primates to Be Cloned from Transfer DNA Technique behind Dolly the Sheep” (24/01/2018), *Evening Standard*, www.standard.co.uk.

⁴⁰ Shivali Best, “Scientists Successfully Clone Two MONKEYS by the Same Method Used to Create Dolly the Sheep in a World First”, *Mirror* (24/01/2018), www.mirror.co.uk.

⁴¹ Andrew Griffin, “Monkeys Cloned in World First, Scientists Reveal”, *The Independent* (24/01/2018), www.independent.co.uk.

‘Question/s’ is often found also in object position, being preceded by *pose*:

(16) However, some of his peers [of Qiang Sun, one of the authors] said that the manufacture of identikit monkeys for research *would pose awkward ethical questions*.⁴²

Noteworthy in this example is the use of the adjective *awkward*, which emphasises the trickiness of the issue at hand. Another frequent collocate of ‘question*’ is ‘address*’, which appears mostly in the passive in the pattern ‘question* need to be addressed’, as in the following sentence:

(17) The technique brings the prospect of cloned human beings closer, but scientists caution there may be no good reason to create such clones and that *ethical and legal questions need to be addressed*.⁴³

These evaluative words are in many cases preceded by an adjective, the most frequent being ‘ethical’ (‘ethical concerns’: 29 hits; ‘ethical questions’: 17 hits; ‘ethical dilemmas’: 10 hits) which in the case of ‘question*’ is sometimes combined with ‘legal’ (‘ethical and legal questions’, 14 hits), thus clearly establishing the ethical character of the issues at hand.

The word ‘fear’, which is used in contexts very similar to those of ‘question’ and ‘concern’, is however rather different from them in semantic terms, as it does not express a rational evaluation of the experiment being reported on, but rather an emotional state caused by a perception of danger associated with it. This helps explain why it is never preceded by the adjective ‘ethical’ (in only one headline there appears the phrase ‘ethics fear’).⁴⁴ See the following examples:

(18) But the breakthrough will inevitably raise fears that human cloning is closer than ever.⁴⁵

(19) Scientists yesterday unveiled two cloned monkeys – prompting fears from critics the technique will be used to create humans.⁴⁶

There are reasons to believe that in this context the use of the word ‘fear’ is aimed at sensationalising the information given, playing on people’s being scared of anything that breaks the ordinary order of things. It appears in articles from various newspapers, with the most insistent use in *The Sun* in its various editions, but also in the *Independent*, the *Daily Telegraph*, the *Express*, the *Scottish Express*, *Metro*, and in releases from news outlets like *NPR* and *BGR*. In actual fact the word ‘fear’, with its irrational emotional semantic load, is never used in general terms, or to refer to animal tests, but only with reference to the probability of human cloning being carried out.

⁴² Andy Coghlan, “Say Hello to Cloned Monkeys”, *The New Scientist* (24/01/2018), www.sciencedirect.com.

⁴³ Andrew Griffin, “Human Cloning Moves Closer”, *The Queensland Times* (26/01/2018), www.questia.com.

⁴⁴ Sarah Knapton, “World’s First Cloned Monkeys: Clone Breakthrough Raises Ethics Fears”, *The Daily Telegraph* (25/01/2018), www.telegraph.co.uk.

⁴⁵ Coghlan, “Say hello to cloned monkeys”.

⁴⁶ Shaun Wooller, “MONKEY CLONE BREAKTHROO-OO; HUMAN COPIES NEXT FEAR”, *The Sun* (England, Edition 2, 25/01/2018), capitals in the original.

Having outlined the main discursive frames associated with ethical reserves and worries about primate cloning experiments, attention will now concentrate on the discursive representation of the specific ethical questions dealt with.

As already pointed out, the issues raised by the success in macaque cloning fall within two main areas, which emerge very well in the following statement by scientist Philip Ball's editorial in the *Guardian*:

(20) Such *biomedical use of primates* [to study the genetic factors behind diseases] is fraught with ethical issues of its own – it is of course *the very closeness of the relationship to humans* that makes such research more informative but also more disturbing.⁴⁷

In Ball's view, the first order of problems regards the procedure of manipulating animals genetically for study purposes ('biomedical use of primates'), i.e. the ethics of research on animals, the second one is the possible extension of the successful procedures to human cloning, which is even more dramatic. This is why here the discussion will first focus on the latter issue.

4.1 *Human cloning*

As far as the first of such problematic areas is concerned, it is quite obvious that there could be expectations that success with non-human primates may soon be followed by the cloning of humans, an issue which is discussed or at least hinted at in most articles, as is proved by the fact that the lemma 'human' has 758 entries, 508 of which refer specifically to cloning (for instance, 'research on human clones', 'closer to human cloning', 'to clone a human', 'making human beings by cloning', 'making a human baby by cloning', etc.).

In many cases the ability to clone humans is discursively represented as the ultimate target of research in this area, making recourse to metaphors of movement and progress. In some cases, it is described as a step forward, e.g.:

(21) And the breakthrough brings the world a step closer to human cloning.⁴⁸

or a leap forward:

(22) At the same time, scientists have expressed concern the leap from cloning monkeys to humans is a narrow one. (*Daily News*, New York)⁴⁹

or as the removal of barriers that impede advancement:

⁴⁷ Philip Ball, "How Afraid of Human Cloning Should We Be?", *The Guardian* (25/01/2018), www.theguardian.com.

⁴⁸ Henry Holloway, "Humans Next? Monkey CLONES Born in Major Scientific Breakthrough", *Daily Star Online* (24/01/2018).

⁴⁹ Joe Dziemianowicz, "Tail Of 2 Monkeys. Historic Primate Cloning in China", *Daily News* (New York, 25/01/2018).

(23) The world's first genetically identical monkey clones have been created by Chinese scientists, who say they've broken barriers to human cloning. (*Qatar Tribune*).⁵⁰

or as an action that proactively contributes to progress towards the goal of cloning humans, thus raising worries:

(24) Dr David King, director of the lobby group Human Genetics Alert, said: "We are concerned that this is a *stepping stone* to the creation of human clones". (*The Sun*).⁵¹

To support this statement, King sees a scientist's ambition to be first as the possible motivation to attempt human cloning, followed by economic attractiveness:

(25) Although it looks technically difficult, those with enough financial resources and the ambition to be the first to create a cloned child are likely to try ... There would undoubtedly be a market for human clones.

It is to be noted that in many cases this kind of stance-taking commentary on the successful cloning experiment is presented in the form of a quotation from an expert's declaration. In this way the various positions are given more credit and authoritativeness, being put forth by insiders, but at the same time reliance on quotations functions as a hedge to the journalists' responsibility for the notions put forth.

Another argument questioning the ethical admissibility and lawfulness of human cloning is the chance that "rogue scientists" may get hold of the procedure and use it "in a celebrity-driven world".⁵² A further point is the unsafe status of the procedure, which is discussed in explicitly ethical terms, quoting from Professor Robin Lovell-Badge, a cloning expert:

(26) "Careful consideration now needs to be given to the ethical framework under which such experiments can, and should, operate.... It would be far too inefficient, far too unsafe, and it is also pointless."⁵³

Quite interestingly, the arguments denying the imminent likelihood of human cloning are not based on principles, but more often on practical considerations, or on scientists' declarations denying that current expertise is adequate and safe to clone humans:

(27) But both the scientists and other experts say it's highly unlikely this advance will result in human clones in the foreseeable future.⁵⁴

⁵⁰ "First Monkeys Cloned from Process that Created 'Dolly' the Sheep", *Qatar Tribune* (28/01/2018).

⁵¹ Wooller, "MONKEY CLONE BREAKTHROO-OO...".

⁵² Rob Stein, "Chinese Scientists Clone Monkeys Using Method That Created Dolly the Sheep", *NPR All Things Considered* (24/01/2018), www.npr.org.

⁵³ Victoria Allen, "ONE STEP CLOSER TO HUMAN CLONES", *Scottish Daily Mail* (25/01/2018).

⁵⁴ "First Monkeys Cloned from Process".

or they deny the willingness to clone humans, referring to the various obstacles to the implementation of the practice:

- (28) The technical barrier to reproductive cloning is in principle broken, Poo said, but societal taboos, ethical concerns and governmental prohibitions remain intact.⁵⁵

Noteworthy here is the explicit recognition of the ethical character of the concerns raised by the cloning practice, which is not frequent in the corpus. In actual fact, there is only one case in the corpus in which the practice of human cloning is openly declared unethical, in an article published in the *New Scientist*, and written by Marcy Darnovsky, Director of the Center for Genetics and Society in the US, which takes a clear stance against cloning experiments on humans:

- (29) Subjecting a human to the dire risks shown in animal cloning – including in monkeys – would represent *unethical human experimentation*. So, too, would the psychological and emotional risks faced by a cloned child.... Human cloning also comes with other unwarranted health risks: to the many women who would need eggs extracted, and to the dozens needed as surrogates for clone pregnancies, which have posed serious dangers in some species.⁵⁶

Reservations against human cloning include criticisms of the possible outcomes of the practice, as pointed out in the transcript of the news programme *All Things Considered* on NPR, which is widely quoted in many of the articles analysed here:

- (30) George Daley: “Cloning one individual in the image of another really sort of demeans the significance of us as individuals. There’s a certain sort of gut sense that it violates sort of a natural norms.”⁵⁷

Furthermore, expectations of obtaining a perfect copy of the cloned subject are only wishful thinking:

- (31) realistically a clone would only be somewhat similar to the individual they came from. They would be less similar than an identical twin [said Darren Griffin, professor of genetics at the University of Kent].⁵⁸

- (31) “We do need to think about not only is it not acceptable, but it is a bit pointless anyway,” said Darren Griffin, professor of genetics at the University of Kent. “What are people trying to achieve if they attempted to do that? Because realistically a clone would only be somewhat similar to the individual they came from. They would be less similar than an identical twin: Scientists will keep watch on Zhong Zhong and Hua Hua, who for now appear to be growing and developing like normal monkeys. They expect more clones to be born in the coming months.”

⁵⁵ Ben Guarino, “Researchers Clone the First Primates from Monkey Tissue Cells”, *The Washington Post* (24/01/2018), www.washingtonpost.com.

⁵⁶ Marcy Darnovsky, “Say No to Human Clones”, *The New Scientist* (31/01/2018), www.sciencedirect.com.

⁵⁷ Stein, “Chinese Scientists Clone Monkeys Using Method That Created Dolly the Sheep”.

⁵⁸ Griffin, “Monkeys Cloned in World First, Scientists Reveal” (24/01/2018), *The Independent*, www.independent.co.uk.

Although only some of these considerations are specifically framed in ethical terms, the final conclusion of the debate, as argued by Darren Griffin, is that “careful consideration now needs to be given to the ethical framework under which such experiments can, and should, operate.”⁵⁹

4.2 *Animal testing ethics*

As already pointed out, the declared purpose of non-human primate cloning is essentially the willingness to study human diseases on animals that are as similar to humans as possible:

- (32) The aim of the scientists was to open the door to populations of genetically uniform monkeys that can be customised for ground-breaking research into human diseases.⁶⁰

In some of the articles, some specific diseases are also mentioned – Alzheimer’s, Parkinson’s, heart disease, metabolic syndrome, even autism.

A further advantage alluded to is the possibility of gene-editing the primates being studied, to obtain populations that make it possible to investigate certain disorders which are otherwise impossible to understand. As Dr. Qian Sun, director of the Nonhuman Primate Research Facility, one of the scientists involved in the experiment, explains: “You can produce cloned monkeys with the same genetic background except the gene you manipulated”.⁶¹ In addition, according to scientists, thanks to the availability of cloned monkeys fewer animals would be involved in experiments, as specified in a Xinhua General News Service wire, relayed by various news outlets:

- (33) Poo said the importance of cloning macaques with the same genes was to reduce the number of farmed animals for experiments. “Researchers used to use more animals for drug test for accuracy, but now we could change the situation with cloning technology,” he said.

But in some of the articles, e.g. in *The Sun*, which takes an obviously conservative attitude to the question, the prospect of creating better and more largely available animal models of disease for medical research is defined worrying in itself:

- (34) But worryingly, the scientists say they now want to create “customisable” populations of monkeys for large-scale animal testing.⁶²

Here, the adverbial of stance ‘worryingly’ signals the problematic character of the action described. The article, whose headlines meaningfully start with the word ‘monstrous’ in capital letters,

⁵⁹ Allen, “ONE STEP CLOSER TO HUMAN CLONES”.

⁶⁰ John von Radowitz, “Cloned Monkeys a ‘Stepping Stone’ to Copied Humans” (25/01/2018), *The Irish Independent*, www.independent.ie.

⁶¹ Holloway, “Humans Next? Monkey CLONES Born in Major Scientific Breakthrough”.

⁶² Sean Keach, “‘MONSTROUS’ First MONKEY CLONES Made by Dolly The Sheep Method Slammed as ‘Horror Show’ by Animal Welfare Experts”, *The Sun* (24/01/2018), www.thesun.co.uk.

then goes on to describe and discuss some of the issues quoting statements from Dr. Qiang Sun illustrating the rationale underlying this type of research, but subsequently gives ample space to reporting the views of those who oppose animal cloning strongly. In particular, it reports the views of Dr Julia Baines, Science Policy Adviser for animal rights organisation PETA (People for the Ethical Treatment of Animals Association) UK:

(35) Experimenters constantly receive funds to perform monstrous experiments on animals, and cloning monkeys is the latest Frankenscience that PETA condemns.... Cloning is a horror show: a waste of lives, time and money – and the suffering that such experiments cause is unimaginable.⁶³

The language used by the PETA expert is obviously sensational, reinterpreting cloning experiments in Gothic terms with reference to horror and Frankenstein (the latter reference also appearing in a *Noticias Financieras* article of 25 January). The second part of the quote, with the striking expression ‘horror show’, coming from an official statement by PETA, is not only cited by the *Sun* in its various editions, but also – exactly with the same wording – by various other outlets, the *Independent*, *Noticias Financieras*, the *Daily Telegraph* and its online edition *telegraph.co.uk*, the *Global Times* and two Australian outlets, *Courier Mail* and *Gold Coast Bulletin*, some of which use it for their headlines.

Quite interestingly, the statement is in some cases attributed to another PETA expert, Kathy Guillermo, senior vice president of the organisation in the US, thus confirming the inaccuracy of the information given. The *Sun* also adds a citation from Penny Hawkins, spokesperson of British animal welfare charity RSPCA (Royal Society for the Prevention of Cruelty to Animals), who explains that there are “huge ethical and animal welfare concerns about this. These are living animals, not just research tools”,⁶⁴ thus highlighting the essentially ethical character of the issue being debated. Animal welfare advocates’ main argument is that experiments on animals are not really necessary nor useful for research and that cloning has a very high failure rate, thus inflicting suffering to a huge number of animals, over 100 million each year, according to Hawkins.

Furthermore, there are reservations as to the health status of cloned monkeys, since the first generations of animals of that type often suffer from diseases: “This raised questions about the long-term health of clones, and added fuel to the fire of those who considered cloning to be unethical”.⁶⁵ The question of animal welfare is also touched upon in a dispatch issued by the Xinhua General News Service (30/01/2018), which attributes negative evaluations to “some animal welfare activists in China and abroad [who] have been critical”.⁶⁶ But quite obviously Chinese outlets tend to minimize the problem.

Over one third of the articles in the corpus report reassuring declarations by the scientists involved who declare they are following “strict international guidelines for animal research, set by the US

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Josh Gabbatiss, “Dolly the sheep: 15 years after her death, cloning still has the power to shock” (14/02/2018), *The Independent*, www.independent.co.uk.

⁶⁶ Liu Wei and Luo Zhen, “Behind the Research: How Chinese Scientists Are First to Clone Macaques”.

National Institutes of Health” (e.g. *The Sun*, 24/01/2018; *standard.co.uk*, 24/01/2018; *The Independent*, 24/01/2018, *Express online*, 24/01/2018; and a number of local newspapers).

At the same time they recognise that observance of strict ethical standards is a *sine qua non* for the continuation of experiments in the future:

(36) Study co-author Dr Muming Poo said: “We are very aware that future research using non-human primates anywhere in the world depends on scientists following very strict ethical standards” (*The Sun*)⁶⁷

Thus, in the representation of the critical issues surrounding the future or primate cloning, the issue of animal testing qualifies as an important factor.

5. Conclusions

This article presents the analysis of a corpus of news articles focusing on the announcement of the success of an experiment of primate cloning leading to the birth of two cloned monkeys. In terms of dissemination of scientific knowledge, the analysis shows that accuracy does not seem to figure among the priorities of journalists, as already pointed out in previous research,⁶⁸ and this is confirmed among other things by the relatively limited recourse to standard popularisation strategies found in the texts. Furthermore, in hardly any of the articles are the real novelties characterising the experiment reported and explained with precision, so the reader is not adequately informed about the state of the art. This is all the more objectionable in terms of journalists’ professional ethics in consideration of the sensitive character of the scientific advances at issue.

A question that receives unexpected attention in the news articles, especially in British and Chinese news outlets, is the actual paternity of the breakthrough, with Britain claiming a big share of the merit for the advance on account of having developed the basic cloning technique originally used for Dolly, and China claiming credit for the improvements of the technique that led to the successful cloning of the two macaques.

As far as the representation of ethical issues connected with primate or even human cloning is concerned, all articles express concern or fear, but only rarely do they actually discuss the nature of those concerns in depth. There are worries that a market for clones should arise, and the only idea of experimenting with human clones is seen as unethical. Only in very few cases is one of the main arguments usually brought against human cloning, i.e. jeopardy to every individual’s uniqueness, brought up. The other main concern regards intensive animal experimentation, for which precise rules are invoked.

In textual terms, it is especially interesting that rather than reporting the various stances, journalists prefer to rely on citations from experts, which relieves them from articulating complex positions and more or less explicitly subscribing to points of view, in a context where information is difficult to evaluate for the layman and ideology has an important role in opinion formation.

⁶⁷ Keach, “MONSTROUS’ First MONKEY CLONES Made by Dolly the Sheep Method”.

⁶⁸ Garzone, “News Production and Scientific Knowledge: Exploring Popularization as a Process”.