Creative Work and Artificial Intelligence: Imaginaries, Assemblages and Portfolios

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ABSTRACT

This article analyses how the impacts of AI technologies on creative work have been identified and constructed. The concept of imaginaries is used as a methodological and analytical approach to analyse a variety of grey literature sources published in the UK. The analysis highlights three interconnecting risk imaginaries in which creative occupations are differentiated from other occupations – they are *safe* and/or are being *complemented*, but are not being *replaced* by automation. The construction and implications of these imaginaries are questioned in two ways. Firstly, the concept of assemblages highlights the everyday role of AI technologies in creative production. Secondly, analysis of portfolio working and multiple job holding problematises the notion of safe creative occupations. This article argues that the relationship between AI technologies and creative work can be partly understood as enhancing creative production and the opportunities for creative work, and partly understood in terms of *uncreative* production and *non-creative* work.

KEYWORDS

artificial intelligence, creative work, imaginaries, assemblages, portfolio working

Introduction

The impact of Artificial Intelligence (AI) technologies on the future of work is a well-discussed issue in news media, industry conferences, and policy reporting (Benanav; Ouchchy, Coin and Dubljević). This article analyses how the impacts of AI technologies on creative work have been constructed within grey literature sources published in the UK.

Using the concept of imaginaries to analyse grey literature (from the following sources: government department, charity, foundation, university, and commercial company), this article identifies a risk imaginary in which creative work is variously constructed as being safe from/replaced by/complemented with the impact of AI automation. Whilst these creative work AI imaginaries constructed within grey literature offer empirically detailed visions and possibilities for the future of creative work, this article identifies two conceptual challenges to how the impact of AI on creative work is constructed.

Firstly, the concept of assemblages (Zylinska *Nonhuman Photography*; *AI Art*) is used to highlight the longstanding and everyday role of AI technologies in creative production. Secondly, the notion of safe creative occupations is problematised by locating creative work within wider ecologies of employment and income generation. These two interventions share common ground in highlighting that the impact of AI automation does not rest on the replacement of humans or on the special status of creative work. Rather, investigating the future of creative work must consider the complex arrangements of everyday creative production and work located within a range of industry sectors.

Artificial intelligence and creative work

This article focuses on the relationships between AI technologies and creative work. Whilst there is a well-established body of scholarly literature on each of these respective areas, the relationship between them has been relatively underexamined. This section provides an overview of AI and then an overview of creative work, before turning to existing research that brings these two areas together and setting out where this article is positioned.

As Liu explores, the term AI is often used interchangeably with other terms, such as intelligent machines, machine learning and deep learning. Liu also recognises the challenges of navigating the expansive literature on AI and responds by dividing the literature on AI into three categories and setting out the variety of underlying analytical perspectives – scientific, technical and cultural. As Liu states, the cultural AI analytical perspective is concerned with "AI development's wider social, cultural, economic and political effects, particularly in the context of the digital revolution" (4). The cultural AI analytical perspective most explicitly connects with this article's focus on understanding AI and creative work relationships. Research categorised by Liu into the cultural AI analytical perspective is concerned with "AI-triggered news trends, processes, actions and relations in a diversity of social settings" (8). These include: how computers affect cognition and sociality; the cultural

construction of AI; the self and identity; global economy; social interaction; and politics and policy.

The future of work is a prominent area of focus in relation to AI and the development of AI narratives. As Benanav reflects, there is a longstanding interest and investment in the potential of AI technologies to transform work: "rapid advances in artificial intelligence, machine learning, and robotics seem set to transform the world of work" (1). The focus on creative work has not yet however received the same degree of academic, policy or industry analysis. For example, West's *The Future of Work: Robots, AI and Automation* explores finance, energy resource allocation, national defense, public service delivery, and legal service. The only time that "art, culture, music, sports and theatre" are mentioned is as "nonwork activities" for which there will be more time to pursue when fewer hours are spent on work-related activities (West 85). Whilst broader notions of creativity as they relate to AI technologies have received considerable attention, particularly regarding the development of ideas and cultural production (Hisrich and Soltanifar), the focus on creative work is less well-developed.

Creative work in the cultural industries as defined by Hesmondhalgh and Baker are those "jobs, centred on the activity of symbol-making, which are to be found in large numbers in the cultural industries" (9). Here, cultural industries are understood as the mixture of commercial and publicly subsidised enterprises found in "the arts" (painting, sculpture, literature, etc.) and "the media' (television, film, music, and publishing)" (Hesmondhalgh and Baker 1). As the authors have identified, there are definitional complexities when it comes to the cultural and creative industries (see also: Galloway and Dunlop; Lee) and how creative work is categorised and defined (see also: Ashton; Toby Bennett; Campbell, O'Brien and Taylor). These complexities include the overlaps and interplays between professional and amateur work, and practices of online content creation (Brake). When it comes to explicitly examining creative work and AI, there have been a few studies which the following reviews.

Makó and Illéssy's examination of automation, creativity and the future of work has a broad scope in exploring employment data relating to creative sectors at a national level. Taking a quantitative approach, Makó and Illéssy use European Working Conditions Surveys to measure the risk of automation of creative jobs with reference to the job elements of perception and manipulation, creative intelligence, and social intelligence. This research provides specific insights into how employment trends in specific European countries might be impacted by automation. Focusing more on creative practices, Taffel's digital video is a notable and important step to examine the specificities of how creative industry practitioners are using AI technologies, specifically digital automation, and perceptions of future trajectories for cultural production. Employing qualitative interviews with creative media practitioners and academics (see also Pfeiffer), Taffel highlights the difference in automation being used to save time compared to how automation enables creative activities.

This article provides a different line of analysis to these existing studies of AI and creative work by examining how AI is talked about in prominent, public materials which have the capacity to frame how relationships between AI and creative work are understood. Liu (8) notes how researchers within the cultural analytical AI perspective examining cultural construction focus on "how different groups leverage different cultural resources and traditions to develop AI narratives that help to advance their differing agendas" (for example: Eynon & Young; Natale & Ballatore) Whilst narratives of AI and creativity more generally have generated sustained interest, this article examines how the relationships between AI technologies and creative work specifically are being understood. To summarise, the contribution of this article within a cultural AI research perspective is to examine narratives of AI (Liu) and debates around the future of work (Benanav) and creative work (Hesmondhalgh and Baker), and establish the importance of how they come together.

Imaginaries of artificial intelligence and creative work

Benanav identifies several sources and fora in which discussions around AI and the future of work take place, including newspapers, popular magazines, social theory, and self-described futurists. As Johnson and Verdicchio argue, there are substantial issues with public (mis)understandings and media coverage of AI. More specific for this article, Benanv identifies the complex and contested discourses around the impact of AI technologies on work. In this article, the concept of imaginaries is used as a methodological and analytical approach to examine how the relationship between AI technologies and creative work are constructed through grey literature. This section evaluates how the analysis of socio-technical imaginaries has developed and the following methodology section explains the research design and the focus on grey literature.

As McNeil et al. note in reviewing the concept of imaginaries, authors "frequently used it with little or no reference to a theoretical or methodological repertoire, but with, nonetheless, a strong sense of its relevance" (435). McNeil et al. focus on scientific cultures, communities and practices in providing a sample of studies using the concept of imaginaries. More recently, Willim gives an extensive account of the term imaginaries that considers a number of disciplinary positions and contexts. In doing so, Willim advocates for keeping the concept "fuzzy, open-ended, and not too distinct and delineated" (54). Of most significance for this discussion of AI imaginaries is Willim's account of sociotechnical imaginaries, "as something that primarily homogenises, holds together, and forms congruity in social worlds and people's lives" (55). Notwithstanding McNeil et al.'s and Willim's reflections on varied and fuzzy usages, the following shows that there is a consistent understanding in academic literature that imaginaries take form in specific discourses and narratives that can shape how a technology is understood and used.

Suchman and Bishop review how the term "imaginary" has been used in Cultural Studies during the 1990s "to reference the ways in which how we imagine the world is shaped not only by our individual experiences but also by the specific cultural and historical resources that are available to us" (327 and

332, footnote 2). Media and Cultural Studies (MCS) and Science and Technology Studies (STS) scholarship has engaged with the concept of imaginaries as a way to examine the diversity of resources through which shared meanings around a technology circulate. This emphasis on extending beyond the individual to historical contexts and resources connects with Lesage and Rinfret's exploration of how technologies are described and classified, and how this intersects with the lifecycle of a technology and changing social and cultural contexts. The importance of wider social and political contexts is also considered in the related approaches of Lister et al. and Dovey and Kennedy. Emerging from their commentary are important points around how technologies are taken up and how they connect with different framings and understandings around desire and fears. This understanding of imaginaries as perceptions and experiences that then shape what is possible is also evident in Bucher's exploration of the algorithmic imaginary and Romic's exploration of cultural imagination in robotic art. Willim suggests that imaginaries "might not be autonomous and totally out of control, but neither are they easily framed, logical or programmable" - they are instead "provisional and imperfect" (55). The article examines how discourses and narratives contained with grey literature create imaginaries of AI and creative work which, following Willim, are provisional but hold together and form congruity.

Researching imaginaries of artificial intelligence and creative work

Discussions of AI technologies and the future of work circulate through a diversity of different sources. Jasanoff et al. identify several interpretative and analytical research methods in STS that enable researchers to address, "the ways in which imaginaries frame and represent futures, relate past and future time, enable or restrict action, and naturalize certain ways of thinking about possible worlds." Publicly available written statements can be used to examine how the links between technologies and social life are created, understood and shaped. As Jasanoff et al. identify, "documents and other verbal texts related to science, technology, and power […] provide some of the most accessible and ubiquitous resources for analyzing sociotechnical imaginaries." Whilst there is an important project to explore and connect this diversity of sources and address both the specificities and affordances of how these sources communicate meanings and the actual narratives and discourses within these sources, this paper focuses specifically on grey literature.

Lawrence notes how public policy relies on the myriad of documents that can be referred to as grey literature – "reports, briefings, legislation, discussion papers, submissions and evaluations and much more." In relation to cultural and creative industries policy, the review of grey literature is well-established (e.g., Tomka). The practical issue for this research of how to establish a sample of grey literature and then focus analysis is guided by two existing studies on discourses of AI. Firstly, focusing on humanlike machines, Suchman (238) notes the importance of various representational media – "demonstration videos, technical reports, media accounts, and Web sites" – and suggests that they create a self-referencing archive. Secondly, focusing on the examination of autonomous technology, Cox (826) draws attention to nodal points in

networks of discursive formations. Taking Suchman's idea of self-referencing representational media and Cox's application of nodal points within a network of discursive formations, this article identifies nine sources of grey literature as the focus.

Frey and Osborne's *The Future of Employment* was initially identified as the starting nodal point given its well-established status and visibility in the field of AI, automation and work. As Wajcman remarks, this report is "endlessly repeated" (121). The grey literature selection process started with Frey and Osborne and three methods were used to establish connections to other sources and identify a self-referencing discursive formation: co-authorship, the same commissioning/publishing organisation, and by citation. From Frey and Osborne, a further eight grey literature sources produced by a range of organisations were identified as nodal points with various degrees of interconnection:

Table 1. Overview of grey literature sources by author, year and type of publishing organisation.

Authors	Year	Type of publishing organisation
Bakhshi, Frey and Osborne	2015	Foundation
Bakhshi, Downing, Osborne, and Schneider	2017	Commercial company
BIES (Department for Business, Energy and Industrial Strategy)	2019	Government department
Davies, Klinger, Mateos-Garcia and Stathoulopoulos	2020	Foundation
Easton and Djumalieva	2018	Foundation
Frey and Osborne	2013	University
Knowles-Cutler, Frey and Osborne	2014	Commercial company
ONS	2014	Government (non-ministerial) department
Wallace-Stephens and Morgante	2020	Charity

Frey and Osborne's *The Future of Employment* is the most-connected source in terms of citation by the other sources and the authors' involvement in other sources. Frey and/or Osborne were involved in co-authoring *Agiletown* with Knowles-Cutler for Deloitte (Knowles-Cutler, Frey, and Osborne), *Creativity Vs. Robots* with Bakhshi (Bakhshi, Frey and Osborne) for Nesta, and *The Future of Skills* with Bakhshi (Bakhshi, Downing, Osborne, and Schneider) for Pearson. Several Nesta publications citing *Creativity Vs. Robots* followed (Easton and Djumalieva; Davies, Klinger, Mateos-Garcia and Stathoulopoulos). The final reports are mainly connected through reference to Frey and Osborne but are significant for referencing creative work within a government policy framing (BIES; ONS) and in relation to Covid-19 (Wallace-Stephens and Morgante). Not all sources were connected to each other and not all sources had the same connecting method. Rather than taking a comparative approach in which particular grey literature sources are selected

and compared, all the sources are taken together and analysed as a network of discursive formations.

The grey literature sources examined in this article span a publication period from 2013 to 2020. The analysis was undertaken in 2021 and does not include publications since 2020. Likewise, this analysis does not include contributions from before 2013 discussing digital technology and employment that Frey and Osborne cite within their report (i.e., Brynjolfsson and McAfee). This limitation is expounded by only selecting English-language sources and only using three connecting methods. There is also the challenge in adequately contextualising each grey literature source to reflect on the societal context and technological developments and on the funding and publishing of the reports. Whilst the analysis is focused on nine sources of grey literature published in the UK, the methodological and analytical approach set out could be used to examine an extended number, range and geographic scope of sources. Notwithstanding sample selection limitations, the grey literature examined in this article provides a spread of publication types with a range of academic, policy, industry and public audiences and shows how these sources inform and reference each other in establishing imaginaries of AI and creative work.

This article employs a document analysis approach in which, as suggested by Jasanoff et al., the focus is on the "linguistic and symbolic elements" and "recurrent themes or tropes" (also evident in other studies employing imaginaries, for example Lesage and Rinfret). The procedures for the document analysis are drawn from Bowen's exploration of documents as "social facts" which are "produced, shared and used in socially organized ways" (27). Bowen summarises how documents "provide background and context, additional questions to be asked, supplementary data, a means of tracking change and development, and verification of findings from other data sources" (30). Within this analysis of creative work AI imaginaries, documents were used for the first (context) and fourth (tracking change and development) purposes. Content from the grey literature was coded using NVivo software and thematic analysis was employed (Fereday and Muir-Cochrane). The coding was organised to identify discussion of: occupations, industries, and skills.

The focus on grey literature aligns well with Bowen's point above on documents as social facts, Lesage and Rinfret's textual and thematic analysis for identifying imaginaries, and Jasanoff's suggestions on using documents to analyse imaginaries. The focus on discourse and narrative constructions within grey literature also resonates with Bareis and Katzenbach who employ the phrase "talking AI into being" to examine national AI strategies. As Bareis and Katzenbach surmise, "the literature on AI's integration into society articulates a strong role for discourse in shaping the present and future sociotechnical pathways" (4). As Olma suggests however, caution should be extended to avoid "the transformation of critical analysis into an exercise in recording statements found in policy reports, government websites and the like." As such, the grey literature examined in this article is encountered and conceptualised as being "both productive and coercive: it constrains the kinds of activity that can be carried out, but it also brings new practices into being" (Buckingham 29; see also Fast and Jansson). The generative capacity of discourse provides a way to conceptualise the importance of grey literature in

constructing imaginaries of AI and creative work that, to return to Suchman, Willim, and Jasanoff, frame and represent futures.

Futures for artificial intelligence and creative work: safe, replaced, complemented

This section presents findings from the analysis of the self-referencing discursive network of grey literature identified above. The most immediate and significant finding in coding the grey literature is that ideas and language of *risk* were frequently connected to the impact of AI technologies, and more specifically, automation.

An initial way of identifying the risk imaginary is through the titles found in the grey literature. A common occurrence is reference to the future, with more pejorative phrasing referring to the "relentless march of technology" (Knowles-Cutler at al.) and the ostensibly antagonistic "versus" framing in *Creativity Vs Robots* (Bakhshi, Frey and Osborne). Moving into the content of the grey literature, the risk imaginary is established most explicitly in the risk categorisation implemented by Frey and Osborne. This report by Frey and Osborne ranks 702 occupations from least to most at risk of computerisation, and has been described by other grey literature as seminal (Wallace-Stephens and Morgante) and providing a blueprint (ONS). This risk imaginary takes on greater visibility and prominence in the news media coverage engaging with Frey and Osborne's study, for example the BBC's quiz, "Will a robot take your job?". Later published grey literature also pursue the analysis of risk (ONS), and the most recently published grey literature source (Wallace-Stephens and Morgante) prominently features the question "who is at risk?" and develops a risk register.

The broad risk imaginary was further nuanced in the analysis by identifying three more specific risk imaginaries: complement, replace, safe. *Complement* refers to how AI technologies directly connect with and shape the ways existing work continues to take place. *Replace* refers to how existing occupations or job roles cease to exist through the impact of AI technologies. *Safe* refers to how occupations or job roles were understood as not being in danger of replacement nor being complemented due to the distance from the impact of AI technologies. The three risk imaginaries were not exclusive to or definitive for a specific grey literature source. Rather, each grey literature source might include several or all of these imaginaries within it. The following illustrates where the three risk imaginaries were identified, and focuses on how relationships between AI technologies and creative work are constructed through them. To most accurately address how the imaginaries emerged within the grey literature sources, the following analysis is structured around the meeting points between imaginaries rather than a self-contained description of each imaginary.

Firstly, meeting points between the *replacement* risk imaginary and *safe* risk imaginary. The impact of AI automation in replacing jobs was identified across the grey literature in relation to a range of occupations and tasks (see ONS cf. Frey and Osborne for how distinctions between occupations and tasks are

made). It is beyond the scope of this article to review each of these occupations. What is most relevant for this discussion is how occupations at risk of being replaced are positioned in relation to creative occupations. Of particular significance is the distinction between occupations at risk of being replaced and creative occupations that are safe (from replacement). This can be seen through several statements offering views for the future of creative work as irreplaceable and safe. Frey and Osborne outline several examples of software generating "novelty" (e.g., the robot painting machine AARON – see Moss), and identify the challenge to "computerising creativity" (28-29). They note that on the risk scale, "it seems unlikely that occupations requiring a high degree of creative intelligence will be automated in the next decades" (28-29). Frey and Osborne's explication around "creative intelligence" is further used to build up the imaginary of safe jobs. Statements to this effect include Knowles et al. reporting that, "the arts and media are least at risk from computerisation" (9), and Bakhshi, Frey and Osborne that, "crucially, for both the UK and the US, none of the jobs at all in the highly creative category are at high risk of automation" (15). This supports the hypothesis of Frey and Osborne that "creativity is a key bottleneck to computerisation: the skills required to innovate are not readily replaceable by a machine." The most explicit distinction between creative occupations as safe from risk and other occupations as at risk of replacement comes with Bakhshi, Downing, Osborne, and Schneider who identify that "creative, digital and design occupations have a bright outlook" (49) with the average probability of increased workforce share.

Secondly, meeting points between the *complement* risk imaginary and the *safe* risk imaginary. The complement risk imaginary differs from the safe risk imaginary by more obviously working through the nuances of how AI technologies are changing creative processes and practices. This might entail aspects of a job being replaced, but in doing so that job remains safe. Whilst the title of Bakhshi, Frey and Osborne's report points to adversarial relationships between robots and humans (the front cover shows two cartoon figures - robot painter and human painter - in opposition), the analysis within the report explores a complementary relationship. Bakhshi, Frey and Osborne continue their point on the bottleneck, noted above, to suggest that "computers serve as a complement to most creative professions, making creative skills more productive" (15). They elaborate on this with the following point that references both the replacement and complement themes:

> […] while the next wave of computer–related technologies is likely to displace a wide range of occupations, they are also likely to complement creative workers. The work of musicians, for example, increasingly involves working with computers to test new creative ideas, and today's architects rely on sophisticated software to visualise their development plans. (Bakhshi, Frey and Osborne 22)

Bakhshi, Frey and Osborne give some consideration to how specific jobs are changing (e.g., musicians and architects). In going through the Crunchbase database the later Nesta-published report by Davies, Klinger, Mateos-Garcia and Stathoulopoulos (23) is able to go further and include examples of how companies engage in activity relating to both AI and the creative industries:

•Advertising and Marketing: advert targeting and analysis of customer behaviour.
•Radio, Film and TV: Use of AI for video compression.
• Music: An AI-powered talent discovery platform.
• Games and Immersive: Development of AI agents for video games.
• Architecture: AI-aided design tools for the residential sector.

There are several other tables and figures related to their analysis of different sources which help in showing the specific connections between AI automation and creative work. The complement risk imaginary also offers a nuanced account in relation to specific aspects of creative processes and practices:

> Recent technological developments mean that AI is likely to become more directly involved in the development of creative content and have a more visible influence. Two recent techniques widely considered to be important for the creative industries as they have provided new creative tools are Generative Adversarial Networks (GANs) and style transfer.

> It has been suggested that these techniques could affect visual effects pipelines in future, automating work intensive tasks such as creating the faces of background characters in films. (Davies, Klinger, Mateos-Garcia and Stathoulopoulos 19)

Davies, Klinger, Mateos-Garcia and Stathoulopoulos's approach echoes with the analysis of tasks rather than occupations that ONS (2019) reviewed. Davies, Klinger, Mateos-Garcia and Stathoulopoulos's contribution to the construction of risk imaginaries around AI and creative work is closely attentive to existing practices and processes and helps to show how the impacts and connections can be constructed simultaneously as replace and complement.

Bringing together the construction of the *safe*, *complement* and *replacement* across the grey literature, two things emerge. Firstly, the creative occupations are distinguished from other occupations in being safe from replacement. Secondly, being safe from replacement does not equate to there being no impact. Rather, creative occupations, practices and processes can be framed in terms of a complement risk imaginary. Taken together, the risk imaginaries analysed constructed the impact of AI technologies and automation on creative work as different to other occupations – they are *safe* and/or are being *complemented*, but are not being *replaced*.

The self-referencing discursive network of grey literature analysed above shows, to return to Jasanoff's wording, "the ways in which imaginaries frame and represent futures, relate past and future time, enable or restrict action, and naturalize certain ways of thinking about possible worlds." As Suchman also helpfully guides, "technologies materialize cultural imaginaries, just as imaginaries narrate the significance of technical artefacts" (48). Herein lies the significance of, firstly, identifying and understanding the narrative role of grey literature in describing, analysing and constructing the significance of AI

technologies, and, secondly, in understanding the limitations and implications of these creative work AI imaginaries. The findings presented get us so far in trying to understand how a self-referencing discursive network of grey literature creates imaginaries that frame and represent futures for AI technologies and creative work. The task, however, is not to count or determine the most definitive imaginary for each grey literature source, but instead address the complexities of how imaginaries are constructed and what is at stake in how they operate.

Expanding imaginaries of artificial intelligence and creative work: assemblages and portfolios

The above section identified three risk imaginaries within the grey literature. The following section now returns the analytical emphasis to their construction. Rather than taking the narratives employed within the grey literature in creating certain risk imaginaries as self-evident, the following questions and unpacks the conceptual underpinnings of these constructions. In engaging with cultural AI analytical perspectives and research into socio-technical imaginaries it is important for this analysis to not only identify the risk imaginaries but also to question the assumptions and conceptual coherency upon which they are formed. The following undertakes this in two ways.

Firstly, the *complement* risk imaginary emphasising new possibilities for AI technologies and creative work can be reconsidered by exploring the longstanding and everyday role of AI technologies in creative production. To do this the concept of assemblages is used.

Secondly, the *safe* risk imaginary emphasising ideas of safe creative occupations can be reconsidered by locating creative work in relation to wider experiences of employment and income generation. To do this the concept of portfolio work is used.

Assemblages of creative work

Analysis of the *complement* imaginary shows how AI technologies are creating new possibilities – new creative work processes and new creative production outputs. Most notably, Davies, Klinger, Mateos-Garcia and Stathoulopoulos address how specific tasks (i.e., work intensive tasks) may be automated. Davies, Klinger, Mateos-Garcia and Stathoulopoulos' analysis of AI and creative work aligns with Flemings' broader comments on the "vast number of semi-automated occupations" where "digitalization does not simply destroy jobs but considerably alters and/or restructures them" (31). Fleming's example of games designers sits closely with Davies, Klinger, Mateos-Garcia and Stathoulopoulos' example of visual effects. The *complement* risk imaginary nuances the relationship between the *safe* and *replace* imaginaries. However, can the *complement* imaginary in which AI technologies are framed and represented as creating new possibilities and enhancing creative work be considered in a different way? To address this, theoretical insights on human-machine

assemblages are used to emphasize how AI technologies are already firmly enmeshed with creative practices and processes in mundane ways.

In *Nonhuman Photography* Zylinska explores the reductive opposition between humans and machines in addressing how "various organic and machinic agents can come together - and apart" (14) within a complex assemblage. Zylinska goes on in *AI Art* to reference the entangled history of humans and technology and move the framing from human against machine to human-with-the-machine and human-as-the-machine (65). Zylinska's (*Nonhuman Photography*; *AI Art*) conceptual examination of human and machine assemblages usefully connects with Duff and Sumartojo who also use assemblage as a conceptual tool to account for the non-human "bodies, actors and forces that participate in the production of creative work" (419). These interventions help move us away from a 'creativity *vs* robots' framing to a 'creativity *and* robots' framing in creative work. Moreover, the concept of assemblage moves analysis beyond seeing AI technologies as tools in creative production, to explore the human and non-human relationships involved in the co-constitution of creative practices and products. As the following explores, this has implications for how the risk imaginaries identified in the grey literature conceptualise relationships between AI technologies and creative work.

Taffel's previously mentioned digital video, *Automating Creativity*, provides an engaging exploration of human and AI technology assemblages. Whilst the *complement* imaginary identified in the grey literature suggests understanding AI technologies as a tool of opportunity for widening creative horizons, Taffel's analysis of software tools such as Magisto and MAGIX Fastcut helps in considering how the impact of AI technologies does not necessarily expand or enhance creative processes and practices. Taffel argues that "contemporary creative work is heavily reliant upon specific processes and practices of digital automation that enable numerous key production techniques for video, photography, music and games." Taffel's analysis helps to identify that AI technologies are *already* firmly embedded within creative work processes and practices and that assemblages of AI technologies and creative work can be mundane.

This point on the mundane relationships between AI technologies and creative work resonates with analysis of cognitive work by Parikka and Cox. As Parikka argues:

> We are gradually realising that digital culture is sustained by hard and repetitious manufacturing processes outside the creative industries circle – for instance, the Foxconn factories in China – but the realisation that creativity is embedded not only in precarious but also in rather repetitious and tiring practices needs to be taken just as seriously. (48)

Parikka's reference to creativity and repetitious practices correspond well with Taffel's account of AI technologies and the automation of production techniques. Parikka also references Stiegler in suggesting that, "instead of smart cultures of skilled professionals in communicative industries, we should acknowledge the systematic stupidity and proletarianisation of 'creative' work" (40). These points also connect with Cox's analysis of IBM's Watson in which

human intelligence is uplifted and human enterprise is emphasized as the source and outcome of interactions with intelligent machines. For Cox, this is a strategic move by IBM to position AI as augmenting worker intellect. Taken together the concept of assemblages and commentaries from Taffel, Parikka and Cox can be mobilised to unpack and reconsider the *complement* risk imaginary.

The impact of AI technologies can be less about grand narratives of enhancing creativity and more about granular narratives of repetition and boredom. The risk imaginaries of AI technologies that focus on AI technologies complementing creative work establish AI as either enhancing creative possibilities for creative workers or freeing up creative workers from the more mundane and work-intensive aspects of work allowing more time for creativity. However, in identifying assemblages and recognising the mundane, a fuller understanding of relationships between AI technologies and creative work follows. The emphasis shifts from the realm of the technologically and creatively vaunted and special to AI technologies being intimately connected to wider processes, practices, possibilities and precarities of creative work.

Portfolios of creative work

The identification and analysis of the *safe* and *complement* imaginaries suggests how creative occupations are distanced and distinguished from other occupations. This analysis also highlighted the underpinning data used to identify and then rank occupations. Variances and divergences in how occupations are categorised is apparent within the grey literature analysed – most notably with the differences between Frey and Osborne, and Wallace-Stephens and Morgante. Wallace-Stephens and Morgante's risk register approach is also notable for cross-referencing and connecting risk associated with automation to risk associated with Covid-19. Understanding the impact of AI technologies on work requires connecting to a wider range of factors (i.e., the impact of a global pandemic). The following argues that understanding the impact of AI technologies on creative work requires connecting creative work occupations to other occupations.

The *safe* risk imaginary focused on the distancing and distinguishing of creative occupations from other occupations. Whilst *occupations* might be categorisable, complex everyday employment experiences and practices mean that *workers* cannot be easily and exclusively categorised. Tensions in how creative work is categorised and (dis)connected with other occupations become clear when engaging with literature on creative work and multiple job-holding (Throsby and Zednik) and portfolio working (Ashton; Bridgstock and Cunningham; Lingo and Tepper). Portfolio working can be used to describe how freelance work in the cultural and creative industries involves project-based working and engaging, often concurrently, with several employers or clients. As patterns of multiple job-holding and portfolio working highlight, understanding risk imaginaries of AI and creative work requires understanding relationships between 'safe' creative occupations and 'replaceable' other occupations.

Trying to precisely identify workers that hold creative occupations and are also involved in patterns of multiple job-holding in sectors impacted by AI

technologies (notably automation) is a difficult task in categorisation. Frey and Osborne's table of 702 occupations presents the possibilities for categorisation of occupations in relation to several different logics. For example, the 10 occupations that share the probability at 0.003. Another possible categorisation could be SOC (Standard Occupational Code) and the 67 occupations that come together through code 29 – 'Healthcare Practitioners and Technical Occupations'. These occupations can then be further categorised in relation to risk. This is evident with Frey and Osborne who rank risk to occupations in a table from 1 to 702 and Wallace-Stephens and Morgante who develop a risk register classifying risk across automation and Coivd-19 through four categories: High Covid-19, high automation risk; High Covid-19, low-medium Automation risk; Low-medium Covid-19, high automation risk; Low Covid-19, low automation risk. As Ruppert suggests in examining practices of categorisation, "if authoritative categories arise out of practical ones, then agents must have the capacity to challenge, change, modify, invent and refuse the categories in circulation" (40). There is then both a challenge and a need in being able to determine the categorisation of creative occupations because these categorisations underpin the risk imaginaries which in turn frame and represent the impact of AI technologies on creative work.

Understanding where and how workers are engaged in creative occupations and other occupations is a complex challenge, but there are indications of this relationship in the grey literature examined. Of most significance is appendix 1 from Bakhshi, Frey and Osborne (15) in which retail sale (SIC 47) and event catering, food service and beverage serving (SIC 56) show low creative probability % and over 50% probability of computerisation. Retail is the most complex category where the changes in consumer purchasing and online shopping impact on employment are linked to computerisation (Knowles-Cutler, Frey and Osborne) but have been compounded by the COVID-19 pandemic (Hall). The point is, whilst creative occupations might be safe from the impact of AI technologies, the (creative) workers who undertake creative (*and other*) occupations are not.

McRobbie's comments on the status of the second job are revealing for investigating the notion of primary occupations. In reflecting on the career choices of a past student, McRobbie notes the irony and tension that creative workers, "rely on a second job which is in effect a real job, even though it may be on a project or on a casual contract" and that "many of the creatives find themselves earning the bulk of their income from the second job" (32). Similarly, Dawn Bennett addresses concurrent working and multiple job-holding and outlines how, "artists meet their needs through acting in multiple concurrent roles and often combine high- and low-skilled positions as required" and that "it is common to find artists working concurrently as a performer, director, manager, teacher, and in low-skilled administrative and technical roles" (312). Drawing on the analysis of creative industries workforce demographics, Giuliani, O'Brien and Brook establish that, "in the core cultural occupations the majority of second jobs are not in creative occupations (80%) and, for the most part, are related to non-professional types of occupation instead (60%)" and that "this suggests, at least for our core cultural workers, having a second job is almost an economic necessity." They go on to suggest, "many creative workers undertake second jobs in order to support their

income, increase their number of working hours, or deal with periods of low demand in their creative occupations" (Giuliani, O'Brien and Brook). Referencing these studies on creative work, portfolio working and multiple-job holding is a way for this article to draw out how difficult it is to examine creative work in isolation from broader patterns and experiences of income generation.

Opening up the complex working arrangements and experiences of creative workers creates a more accurate understanding that, returning to Ruppert, challenges how a simple category of 'creative worker' can be deployed when examining the impact of AI technologies and automation. For the creative worker, creative occupations might only be part of a number of income-generating activities. Whilst creative occupations might feature within the grey literature as being safe from the impact of replacement by automation, the impacts of automation on a range of other jobs shapes the possibility to do creative work and maintain creative occupations. Creative work AI imaginaries that frame creative occupations as being safe from replacement must also consider the precarious, portfolio working experiences of creative workers.

Conclusions: "Safe creative jobs" and "unsafe uncreative jobs"

Through the analysis of a self-referencing discursive network of grey literature, this article examined imaginaries which frame and represent the relationship between AI technologies and creative work. Imaginaries provided a methodological and analytical approach that enabled the initial identification and analysis of three interconnecting risk imaginaries: safe, replacement, complement. Through these imaginaries the grey literature constructs the impact of AI technologies on creative occupations as different to other occupations – they are *safe* and/or are being *complemented*, but are not being *replaced*. The exploration of three different risk imaginaries in relation to AI technologies and creative work shows the intermediate position Willim expresses between imaginaries as provisional, and as purposeful and homogenising in holding together particular visions.

To advance this analysis, the construction and implications of these imaginaries were examined in two ways. Firstly, the concept of assemblages was used to highlight the longstanding and everyday role of AI technologies in creative production. This opened up the relationship between AI technologies and creative work to recognise not just the more spectacular visions of enhancing creativity but also repetition, boredom and the mundane. Secondly, analysis of portfolio working and multiple job holding was used to problematise the notion of safe creative occupations. Occupational opportunities and challenges for creative workers are bound up with the ways in which AI technologies might impact on many different industrial sectors. Importantly, this means avoiding the separating of 'safe creative jobs' and 'unsafe uncreative jobs'.

The significance of the analysis in this article is, firstly, for understanding how grey literature constructs imaginaries which frame and represent the impact of AI technologies on creative work, and, secondly, for conceptualising how

these risk imaginaries can be questioned and unpacked. In both identifying and questioning these imaginaries, this article argues that the relationship between AI technologies and creative work can be partly understood as enhancing creative production and the opportunities for creative work, and partly understood in terms of *uncreative* production and *non-creative* work.

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