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TREATING AUDIO MANIPULATION EFFECTS LIKE PHOTOSHOP: EXPLORING THE NEGATIVE IMPACTS OF A LACK OF TRANSPARENCY IN CONTEMPORARY VOCAL MUSIC ON YOUNG LEARNERS

Abstract: Amidst the great and rapid advance in digital audio processing over recent decades, a range of new 'manipulation' software has problematised the popular music scene, both in terms of authenticity and achievability of performance. This paper will set out to define *manipulation* effects as separate from the more over-arching umbrella term of *staging* effects, under which they have been vaguely included for a number of years. By separating out the staging of vocals from the manipulation of their core content, by pitch correction for example, we can more specifically observe their impact on audience reception and vocal pedagogy. The reception element of this research would be largely related to that of authenticity and the presentation of liveness in online video, but this paper will focus on the effect of the unachievable on vocal learners. These could range from confidence issues to serious vocal problems.

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This paper explores the possibilities of music following the same trajectory as photography, where manipulation is concerned. Photoshop's usage in media has provoked a great deal of controversy in recent years, with high profile campaigns resulting in legislative changes such as Israel's *Photoshop Law*, which imposes certain restrictions for models and a disclaimer requirement for publishers. It's a possibility that if the music industry were required to provide disclaimers for audio releases and online videos, that there would be more transparency in vocal pedagogy, with the potential for fewer vocal health problems related to copying unachievable performances.

The aim of this paper is to open a conversation about the effect of a lack of transparency surrounding audio manipulation so that more can be done to address it.

Keywords: manipulation, digital effects, Photoshop, Auto-Tune, disclaimer, transparency.

Introduction

The last 25 years have seen exponential growth of digital effects for the production of music, with Antares Auto-Tune developing from the outboard unit that produced the oft referenced and ground breaking new sound of Cher's *Believe* in 1997, to the current fully digital software solution of Antares Auto-Tune Pro that boasts the ability to manipulate not only pitch, but 'throat modeling' and 'automatic formant correction' (Antares 2022). In this time, the image editing software Photoshop, which was originally released in 1990, has not only undergone a similar development, democratisation and cloud-based accessibility, but has influenced headlines and legislation because of its potential for deceit and the impact that potential manipulation could have on public health, both physically and mentally. Whilst it would be insensitive to suggest that the social impacts of audio and visual manipulation are comparable in influence from a public health point of view considering the impact of visual media on eating disorders and body dysmorphia, as well as other aspects of mental and physical health, it is interesting that audio manipulation, as discrete from other forms of audio staging, has not been problematised in the same way as its visual counterpart.

This paper will use the similarities between photo and audio manipulation to suggest the potential positive and negative outcomes of following the *Photoshop* blueprint of public transparency to audio-manipulation's use in digital media. Whilst Adobe Photoshop is not the only photo editing software on the market, it is the market leader and as such has been the go-to for worldwide media on the subject, as well as the shorthand name for multiple countries' laws that have

involved restrictions on manipulation use in visual media. For this reason, this article will use the term Photoshop to refer to visual editing software in general.

In order to problematise the impact of audio manipulation within the context of public reception, this article will first contextualise manipulation for audio in an academic space that has previously included the term under the broad umbrella of staging. It is important to make clear that this article's remit includes intrinsic, and not explicit, uses of technology. These definitions stem from Robert Strachan's definitions of pitch manipulation's use in popular music, where he reminds us that "Auto-Tune was envisaged as a transparent technology and its explicit usage is essentially a misuse or overuse of the function for which it was originally intended" (Strachan 2017). Much in the way that the obvious photoshopping of a cartoon prop in a magazine article would not be the concern of Photoshop legislation for the modelling industry in Israel (where the Photoshop Law is in effect), the robotic Auto-Tune effect of T-Pain's signature style is similarly not a manageable inclusion within the formulation of a theoretical *Audio Manipulation Law,* where purposes are crossed between style and corrective use. For this reason, only intrinsic use of effects, categorised as "unannounced and actively hidden, leading to a normalisation of the sonic qualities it produces" (Strachan 2017) will be considered for their impact on the reception of audio and, subsequently, the impact that any transparency measures such as disclaimers could potentially have for the artists involved.

This paper's focus will be on vocals within music. I leave no boundary between classical and popular styles because of the reception focused nature of this research, and I would not like genre definers to muddy the argument that focusses on transparency of process. Vocals have been chosen here because of the audience's inherent feeling of vocal exclusivity when listening to music. Several scholars have made the case for the exceptionalism of the singing voice to listeners due to a multitude of factors such as maternal nurture within infancy (Karpf 2006), the association of humanity to the voice (Jarman-Ivens 2011; Connor 2000), and the uniqueness of individual vocal timbres or grains (Barthes 1991). Michel Chion, in reference to sound in film, describes humans as "vococentric" (Chion 1994, 6) and extrapolates further by explaining that it is "because human beings in their habitual nature are [vococentric] as well. When in any given sound environment you hear voices, those voices capture and focus your attention before any other sound (wind blowing, music, traffic). Only afterward, if you know very well who is speaking and what they are talking about, might you turn your attention from the voices to the rest of the sounds you hear" (Chion 1994, 6). Closely linked to Chion's 'vococentricity' is Derrida's observation of 'phonocentrism'. In the same way that Chion notes that listeners are inherently drawn to the sound of a voice, in search of information or storytelling, "Phonocentrism, in Derrida's view, is a cultural tendency that establishes

vocal utterance as the most reliable indicator of individual intentionality, as the locus of testimony and authenticity" (Bhagwati 2013, 78). This can therefore be seen as the second step in a process of human reaction to the voice. From voco-centricity's step one of seeking out and foregrounding the voice as the highest aural priority, to phonocentrism's step two of imbruing the human voice with an innate authenticity.

With this in mind, I have chosen to focus on how people perceive the presentation of vocal manipulation because of the seemingly higher levels of humanity and authenticity that are naturally associated with it. I believe that by doing this, it will create a clearer picture of the impact of increased transparency where manipulation effects are concerned because vocals have the clearest and most visible connections to the self, authenticity, and the concept of talent.

The objective of this paper cannot be to problematise and suggest the complete and final answers to the problems brought about by a lack of transparency in audio-based media. Rather, I am aiming to start the conversation on how a longer research trail could be approached going forwards. This paper will set out the problems faced by those teaching and learning to sing, before approaching a potentially suitable course of action. The course of action akin to an *audio manipulation law* would involve the implementation of disclaimers based on the intrinsic use of manipulation effects on the voice, taking care not to limit the creativity of creators and producers whilst increasing transparency of usage regarding effects that change core elements of the original performance. It will act as a proof of concept before much more specific problematising of issues regarding its implementation.

Vocal Staging and Manipulation

To stage a sound within recorded music was a concept initially approached by William Moylan in the 1992 first edition of *The Art of Recording*. Moylan describes the *sound-stage* in recorded music, which is a conceptual space for the listener, as "the location within the perceived performance environment, where the sound sources appear to be sounding" (1992, 48). This is predominantly a spatial idea, regarding the stereo field ranging from left to right and encompassing the centre ground, but also allowing for the pitch of the sound to orientate a sense of aural location of its source on a vertical axis. In the year 2000, Serge Lacasse refined the concept with regard for the voice, coining the phrase *vocal staging.* This aimed to express the effects that different presentations of the voice, often through a prism of technology, can have on the expressive impact of the voice on the audience. Lacasse defines vocal staging as "any deliberate practice whose aim is to enhance a vocal sound, alter a timbre, or present it in

a given spatial and /or temporal configuration with the help of any mechanical or electrical process, presumably in order to produce some effect on potential or actual listeners" (2000). Throughout Lacasse's various works, the terms staging and manipulation are constantly conflated, offering the field the blanket term of *staging* as a catch all for technological intervention upon a vocal sound. Indeed, the dissertation abstract for *Listen to my Voice* states the research to be "centred on voice manipulation, or, … the staging of voice in recorded rock music and in other forms of vocal expression" (2000). In the interest of deeper study, and the examination of potentially conflicting audience reception ideologies, I suggest that *staging* and *manipulation* be seen as separate sound transformation categories, the former concerned with placing the sound object within a space or scene and the latter concerned with the changing or warping of the original sound material. It could be said that the former alters the perception of the sound by placing it into a contextually loaded frame, whilst the latter alters its content at a core level.

By seeing audio technologies as separated in this way, the traceability of the core musical content becomes clearer and the concept of personal authenticity has the potential to have more of a connection to staged performances than manipulated performances, due to the intact nature of the tracked vocal. Drawing the line to the human core of any performance is frequently hugely important for audience members, owing to what Kivy terms *personal authenticity,* meaning that something is "authentically one's own, emanating from one's own person" (Kivy 1995). The drive of this research is to aid in the world of vocal pedagogy, and to create a transparency of process for learners so that they have the opportunity to understand what is acoustically achievable to aid in the learning process, but also to steer away from the possibility that the unachievable pushes people towards unhealthy technique or a feeling of inadequacy when unable to perform the un-performable. By marking staging and manipulation as separate, it can be easier for measures to be put in place to grant the necessary transparency for learners.

What is the Current Impact of Vocal Manipulation for Vocal Students?

As part of a larger research objective, I carried out a study with ten vocal pedagogues from across the UK, spanning genres and vocal styles across the classical and popular worlds in order to discuss the impact that manipulation and staging technologies were having on their students' approach to vocal tuition and their attempts to sing more generally. The key themes that consistently came up were the issues of transparency and achievability. For a vocal student to attempt to copy a recording of a singer without the context of the processes

that their voice has gone through has, according to many of my participants, caused students to adopt pushed, restricted or dangerous techniques in order to replicate a fuller, mediated sound using natural means due to the lack of transparency regarding the technologies used and their application.

As an overview of the types of effects and problems, I shall now give an example of the effects that participants claimed to be causing problems for their students and how they've had to alter their approach to teaching in order to counter potential repercussions. Firstly, compression is an audio effect that is arguably rather difficult to categorise. From a technical level, the clarity of whether compression changes the core content of the recorded audio is purely academic, since it has been seen that the effects that its usage has on learners have been the most widely echoed and have caused the greatest problems for the students of our participants. Compression is a tool that reduces the dynamic range of a sound by setting a threshold for amplitude and acting to reduce any sounds above that threshold by a ratio of the producer's choosing: 2:1 for example reducing the dynamic range of the signal above the threshold by half. Compression has been used liberally and increasingly over the last few decades, contributing to the loudness wars that were said "to be the consequence of an observation made in the 1950s that people tended to play the louder-cut records in jukeboxes more often." (Robjohns 2014). This was a practice that only got more prevalent as technology and media improved, allowing little to no movement in volume in some cases and "with each passing year, CDs got more compressed. More waveforms were slammed up against that 0 dBFS barrier." (Milner 2010). Often, to present a powerful and very present sounding vocal, the dynamic range in mainstream popular music has found itself squeezed to the point that there is no great discernible difference from loud to quiet, with emotion being conveyed by breathiness and timbre instead. For a singer entrenched in the modern production aesthetics, the research participants have said that the compression used in recordings is there to energise the sound and create an exciting vocal, but "nodules hard and soft, and vocal fatigue and all of the things that hamper their development start to happen when they don't understand the importance of vocal technique in trying to emulate a sound that requires them to, as they perceive it, push." (Anonymous Participant, Interview, 2021). By instinctively pushing their voice to sound like the prominent and consistent voices of modern recordings, the consensus among the participants is that a lot of strain is brought upon the phonation apparatus of the vocalist causing a lot of very dangerous strain in an area where freedom and release is much more appropriate.

Not physical harm, but equally damaging, is the potential for compression to affect the confidence and anxiety levels of an aspiring singer as it "can often give the illusion of evenness through the voice" (Anonymous Participant, Interview, 2021), something that can dishearten adolescent singers, who desire an even and

powerful tone, but developmentally are going through hormonal changes which often manifest as breathy and weaker in the passaggio[2] areas of the range. This in turn can restrict the ambition, confidence and even enjoyment for the singer "because they think that they can't sing high and they will often say as much as well. They'll often say, 'oh, I don't sing high', or 'I can't sing high' because they've tried to push their chest voice too high and felt uncomfortable or tired them out or it's even caused them to lose their voice if they've done it consistently" (Anonymous Participant, Interview, 2021).

Other effects and techniques were indicated as being potentially detrimental to vocal students, such as composite vocal takes and Auto-Tune, but the key thing that tie all of these problems together is the lack of knowledge about them and transparency of their usage. Robert Edwin, pedagogue and scholar for the NATS bulletin (now called the Journal of Singing), supported the overall thesis of this paper when he was interviewed as saying "Young singers trying to copy the altered voices they hear can get themselves into vocal trouble very quickly" (Benson 2020, 192).

Comparing audio manipulation technologies and Photoshop

Out of all of the interviews conducted for this study, one participant proffered a very active comparison and course of action to that of Photoshop and its cultural impact on young girls where body image, positivity, and eating disorders are concerned. The participant suggested that:

> It's like the Photoshop movement. It's like, you know, it's becoming forward now that you need to say if you've edited a picture because people are trying to look like something that doesn't exist, it's the same with sound. I think if it's on Instagram or it's on YouTube or it's on something like that. It needs to be put in the information that it has been edited. So that people know that the sound isn't always natural. (Anonymous Participant, Interview, 2021)

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2   Cornelius L. Reid defines and advises on the passaggio in *A Dictionary of Vocal Terminology* as such:

 "**Passaggio:** Italian, "passageway;" an early frame of reference used to indicate that portion of the tonal range, or "break" (E—F above middle C), where it is necessary to cross from the chest voice to the head voice smoothly and evenly. Although developmental procedures must be designed to lay the foundation for an ultimate smoothness in negotiating the *passaggio,* such attempts should never be incorporated into early training procedures. The smooth and easy negotiation of the *passaggio* without loss of range, resonance, or flexibility is the hallmark of technical mastery" (Reid 1983, 265).

I shall now be examining the body positivity movement's effect on cultures and legislations regarding Photoshop's usage in the public sphere. In doing this, I will be applying the measures theoretically to that of content containing manipulated sound, to see which measures would be practicable, worthwhile and unobtrusive to creativity. It is important to note that this paper is not *anti-technology,* and I do not advocate a total abandonment of different usages of such technologies. I argue that the usage of these technologies should be made clear in order to limit the aforementioned problems associated with ignorance to certain processes.

Firstly, to equate the usage of photo manipulation software to that of audio manipulation, there must be a parallel to how the general public receives them both in kind. Jones suggests that "increasingly, all of our important global images are photoshopped: we now expect that adjustment has happened, even as we continue to demand that photographs represent the real" (Jones, 2013). For this to be true of audio recordings throws up two important challenges. Firstly, that the audience has the same kind of awareness of the technology involved in audio recording and production as they do regarding visual media. By this, I do not suggest an in-depth technical proficiency and knowledge, simply a surface level knowledge of its existence through pop culture. I do not yet believe this to be the case, as there have not been the campaigns of awareness and public displays of concern that have accompanied the body positivity movement's outcries for more inclusive and un-doctored imagery in the media, associated with audio in nearly the same way. This kind of awareness is, in essence, part of the desired outcome of a disclaimer style system for music in the eyes of the participant that recommended it. By looking at how awareness of *photoshopping* has affected body positivity outcomes such as dysmorphia and eating disorders, there could be parallels to be drawn to project the potential for positive benefits in the music industry. If this change does in fact take place and, as Jones suggests "we now expect that adjustment has happened" (2013), the desire for authentic, *untouched* recordings still exists, but with no marker or descriptor to legitimise it. As with *live* music and *acoustic* guitar, the original or unfettered version of something becomes demarcated as the *other* version rather than the standard due to its requirement for a descriptive adjective.

Two of the major enforcements to come out of the campaigning and legislating that has been ongoing from body positivity movements have been in the form of mandatory disclaimers (Knoll, 2020) and Israel's more encompassing and restrictive legislature *The Photoshop Law*, which "says that models must present their employer with a certificate from their doctor that states that they have a BMI of at least 18.5 in order to work" (Bromberg and Halliwell, 2016), a requirement that some other countries' governments have adopted, such as France, who subsequently passed their own form of the law termed The French

Photoshop Law, which states that "'[c]ausing a person to seek excessive leanness by encouraging prolonged food restrictions' is a criminal offence" (2016). To translate this second form of compliance into the world of audio production would be akin to banning the intrinsic usage of manipulation effects or setting a threshold for the intrinsic usage of effects to be kept under. Given that the Photoshop laws have been enacted to allay potentially mental health problems, it stands to reason that the audio equivalents need not be as prescriptive and restrictive in their remit. Many would argue that the use of these audio effects, even in their most intrinsic forms, contribute to the overall artistic freedom to create that producers value when sculpting the sound of their music, and to restrict this is to impose restrictions on further creativity and exploration. Potentially, then, disclaimers much in the way of Photoshop's "the image of the human figure has been retouched and/or digitally modified" (Knoll 2020) could be adapted to raise awareness of the levels and prevalence of manipulation present in the recording being presented. The minutia of such a disclaimer and subsequent instances of its use would ultimately have to depend on which effects were ultimately deemed to be *manipulation* effects rather than *staging* effects, with compression being the contention due to its integral nature within modern production and the obvious impact that this paper has shown it to have on young voices, according to the research participants.

Where Photoshop is concerned, a number of studies have been done to determine the effectiveness of disclaimers on manipulated images as to whether the audience receives the image any differently to when it has had no disclaimer. Although the image may have the same content and therefore presumably the same initial visual impact, the idea of the disclaimer is to contextualise the image for the viewer so that its content does not affect their self-esteem and body image in a negative manner, such as it did when the image's status was ambiguous. In the same way, a musical equivalent that would be likely to hold a disclaimer could be akin to *the sound of the human voice has been digitally manipulated in this recording,* and it can be assumed that the contextual information provided by the disclaimer may have the ability to allow the listener to inform their approach to the learning process.

Evidence from eye-tracking research based on the attention given to disclaimers states that "women do attend to these disclaimers" (Bury et al. 2014), but concludes that the specificity of such disclaimers, for example "Warning: This image has been digitally altered to lengthen and thin legs" (2014), rather than the generic "Warning: This image has been digitally altered" (2014), does draw the participant's eye towards the area of interest specified within the disclaimer. For the fashion industry, and in support of the body positivity movement, this study suggests that specificity "may actually be detrimental and thus should not be used", since it has the potential to lead "vulnerable women and

girls to pay more attention to the model's body and relevant body parts than they would normally" (Bury et al. 2014). When translating this into the disclaimer's use within recorded music, be it in audio streaming or an audio-visual context, it remains to be investigated as to whether the *eye-drawing* (or indeed ear-drawing) characteristics of the more specific disclaimer would be a benefit or a hinderance to either the listener or the vocal student. After all, if it were to be believed that people simply assumed a generic manipulation across the board, then a degree of specificity would greatly de-mystify the human voice on the recording.

Whilst it can be seen that disclaimers are attended to for visual media (Bury et al., 2014; Bury et al., 2016), this does not necessarily equate to their effectiveness. Firstly, for this research, determining their effectiveness requires establishing what is considered *effective* or successful for our requirements. For visual media, in the research of Frederick et al. (2016), effectiveness was measured by the differentiation in body satisfaction between viewing "unaltered images" and images with disclaimers attached (2016). But to assess the impact of disclaimers on vocal performances, effectiveness would have to be measured as it pertains to the vocal student, and how the increased awareness would affect their approach to vocal tuition and performance.

The implementation and evaluation of such disclaimers will take a great deal more research to determine how and what is appropriate with their design, placement and effectiveness, but reflecting on the body positivity movement's influence on regulations, it does seem that an active awareness of technology could be a positive step in supporting vocal health and technique for the next wave of CCM singers.

Implementing Audio Manipulation Disclaimers in Online Video Performance

This paper has brought into focus the effect that a lack of transparency in the usage of intrinsic manipulation effects can have on the mental and physical well-being of a young performer. The inherent vococentricity in music has meant that when aspiring singers listen to manipulated vocals in music, they are inspired by what they hear and wish to emulate it. The voice exudes emotion in such a way that these students understand its importance as their primary tool for self-expression. This being the case, it is especially important that, much like in the body positivity movement, young people cannot be pushed to vocal harm or mental anguish by the quest for the unachievable when the voice remains so important for subjectivity and expression for both the performer and listener.

Videos from satire and parody accounts on social media and online video sharing platforms have been increasingly providing disclaimers or *notices of transparency* for their content in recent years. These accounts often provide direct-to-camera *real life* tricks or tips involving a ridiculous concept. As an example, here is the disclaimer from a YouTube video by creator Rick Lax, where Lax shows how to make mini marshmallows by removing the air from regular marshmallows with a backwards hair dryer: "Notice of Transparency: All of the events that take place in this short-film video are purely fictitious. Any similarities to actual people or actual events are coincidences. This video's only purpose is entertainment" (Lax 2021). True to the notice, the video is, of course, fictitious, but does provide an established avenue to pilot the disclaimer's use within the online video presentation of singing. Whilst the problem of audio manipulation transparency is not at all confined to the area of online video, the manner in which online videos are presented with descriptions provides the most accessible and clear route to test the deployment and effectiveness of disclaimers in the context of music.

This paper is meant as an introductory step to test the concept of using disclaimers for voices that have been subject to audio manipulation as part of their production. Here, I have brought to attention the potential and observed negative impacts of technological innocence for vocal learners in an attempt to address how transparency can be effectively achieved. To take this forward into an actionable project, more specific focus would have to be made to the implementation and content of such disclaimers, the audience reaction to their presence and the effect that such admissions of transparency would have on the producers and creators of audio content. It is likely that given time and normalisation of disclaimers, there could end up being a stigma attached to the usage of manipulation software, which is entirely not my intention. Transparency should in no way be allowed to stymie creativity.

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(summary)

I compare the similarities between Photoshop and audio-manipulation software such as Auto-Tune by problematising that a difference between manipulation and staging for digital audio effects is yet to be talked about in terms of how each effect works with the core audio. I suggest that the concepts of staging and manipulation be separated out in order to better assess the impact of their distinctly separate uses on core recorded audio.

I address that for the general listener, the idea of personal authenticity is key to their fan experience, but broaden the argument to show that transparency of process can actually have a lot more physical and developmental impact when it comes to the world of vocal pedagogy. Recent, anonymous interview research of a wide range of UK-based pedagogues is then drawn upon to create a picture of the types of impacts that hidden manipulation technologies could be having upon young learners early in their vocal journeys.

Stemming from a suggestion from an interview participant, the paper then turns to the possibility of using a disclaimer or *notice of transparency* for manipulated vocal music, in much the same way as countries including Israel have done with Photoshop in the fashion industry.

The paper concludes that transparency is a positive thing for vocal learners, but recognises that such disclaimers are likely to have other impacts and varying levels of effectiveness. More focussed research on disclaimer impacts on transparency and authenticity for creators will be necessary in the future if the concept were to be introduced effectively.