

3 Role and Context of Technology for Music-Making

The previous chapter has introduced various facets of the Gear Acquisition Syndrome phenomenon and discussed psychological, social and musical reasons why musicians spend money on their equipment. It also suggested the existence of different overlapping subgroups: players, collectors, gear heads, purists and crafters. The purpose of this chapter is to develop a deeper understanding of equipment in the context of music-making. Against theoretical and empirical backdrops, we analyse why musicians invest in gear and how the musical instruments industry and other factors influence the intention to buy.

3.1 Music Technology and Popular Music

Academically, the popular music discourse generally recognises the significance of music technology: ‘Without technology, popular music would not exist in its present form ... popular music is, at every critical juncture of its history, determined by the technology musicians use to realize their ideas’ (Jones 1992: 1). Each step of the process requires technology, be it in the rehearsal room, on the live stage or in the studio. Despite the crucial importance of recording and production technology for the mediated manifestations of music we consume in everyday life, ‘it is at the level of composition and realization that one should begin to analyse the relationship of technology and popular music, for it is at that level that popular music is formed’ (Jones 1992: 7). Music takes shape through musicians playing their instruments, which is what the media-focused study of popular music sometimes overlooks. We begin our investigation at the source of musical creation by considering musicians’ intentions when selecting gear and configuring setups, choices that will influence their artistic expression in the long term.

A decisive factor in the discussion of technology and sound is the music genre. Genres are characterised by various styles, such as playing styles of different instruments, personal styles of individual performers, and recording and production styles.

Musical style is analogous to spoken language. Just as the sounds that make up a word mean different things in different languages (or, at least, potentially do so), so the sounds that make up music have different significances depending on the style. This is a tricky idea since, although we know implicitly the difference of sound between the blues and gospel, between swing and country, between rock and metal, those differences cannot be defined exclusively. (Moore 2012: 13)

On a holistic level, every style of music has sounds that define it in some way. Such defining sounds can be as general as the use of a particular tone, as per Walser’s (1993: 41) often cited definition of metal music: the ‘most important aural sign of heavy metal is the sound of an extremely distorted electric guitar. Anytime this sound

is musically dominant, the song is arguably either metal or hard rock; any performance that lacks it cannot be included in the genre'. Sometimes much smaller differences between sounds of individual instruments are accountable for the distinction between genres. The sound of a kick drum fundamentally differs within the subgenres of electronic dance music (Zeiner-Henriksen 2006), as much as it does between rock and metal genres (Mynett 2011). Consequently, musicians must consider their choice of gear. In their musical development, they learn what equipment is expected or works best in a particular style. This expertise is accumulated through playing experience, experimenting with gear, and discussing it with fellow musicians, reading magazines, visiting websites, and watching video tutorials. Some instrument guides advise on purchasing and modifying equipment to suit musical styles (Balmer 2018; Brewster 2003; Chappell 2010; Kovarsky 2013; Sidwell & Dickinson 2011; Smith 2017), but such traditional teaching texts today play only a minor role compared to the diverse educational resources on the Internet (Menze & Gembris 2018, 2019), many of which are freely available. Sometimes retailers classify instruments stylistically, hence setting a normative reference point. Thomann, for example, lists 'Heavy Basses' and 'Heavy Guitars' in addition to classic shapes like Stratocaster and Telecaster, thus separating instruments models by genre.² 'Heavy' is not a genre, but even novice musicians will understand that this gear is intended for 'heavy metal' and the more extreme subgenres within metal music. Interestingly, this stylistic classification is only made for selected instruments such as the guitar, indicating a higher level of genre-specific specialisation for this instrument. For other instruments, a distinction is made between acoustic and electronic (drums), the kind of sound generation (keyboard instruments) or the tuning and pitch range (brass and wind instruments). The primary criterion for distinguishing 'heavy' guitars and basses seems to be visual because most of them have more extravagant shapes and finishes. The technical differences concern both pickups, which are more suited for high distortion levels, and vibrato systems like Floyd Rose, allowing more extreme modulation techniques such as 'pitch bombs' common in metal music. Apart from Thomann, several larger retailers distinguish between 'regular' and 'heavy' instruments. Music Store, for example, has a dedicated 'Heavy Metal Shop'³ for guitars, guitar amplifiers, guitar effects and guitar accessories like leather and rivet straps, but nothing comparable for any other instrument.

Little research exists on musical instruments typically played in the diverse genres. Considerably more has been written about recording and production, at least if practice-oriented manuals are considered (Felton 2016; Langford 2011; Morton 2000; Mynett 2011, 2017; Snoman 2009). Herbst's (2016, 2019b) study is one of the

² The only other 'exoticised' genre is jazz.

³ The British version of the online store, operated by DV247, labels the subsection as 'Heavy Metal Shop', whereas the original German version lists it as 'Heavy Shop'.

few investigating how genre preferences relate to guitar players' favourite gear. As was to be expected, musicians of less distortion-intensive genres such as jazz, soul, funk and reggae prefer guitars with single-coil pickups (Stratocaster and Telecaster) and semi or hollow-body models, amplified by combined head and cabinet devices ('combos') with less than 30 watts of power. As a traditional setup, it is best suited to produce undistorted and slightly overdriven sounds and offers a wide range of tones. Players of blues, classic rock and hard rock prefer the Les Paul shape with humbucker pickups played through larger amplifier stacks (separate head and cabinet) with various power specifications; such a setup works effectively for these genres because it is characterised by moderately distorted sounds that can be 'cleaned up' if necessary. Most metal guitarists prefer 'Superstrat' models (Stratocaster shape with humbucker pickups) combined with high power amplifier stacks. This setup allows for producing low frequencies and significant distortion with relatively little noise. In terms of preferences for technology (valve, transistor, hybrid, simulation), players of the various genres differ in many respects, especially their use of additional pedals or specific rigs.

Similar differences between genres also exist for other instruments. Bass players, just like guitarists, can choose from a range of physical shapes and pickup configurations that affect the sound to better suit 'cleaner' or 'grungier' genres. They also need to find the right amplifier technology, for example, transistor, valve or hybrid, and a suitable speaker cabinet. Smaller 10-inch speakers support more percussive styles like funk, while larger 15-inch speakers reproduce lower frequencies suitable for modern metal or reggae. For drummers, shell sizes determine the overall tone and suitability for different genres. 'Lighter' genres tend to use smaller shells like 16 or 18-inch kick drum and 8 to 14-inch toms. In comparison, the demand for sonic weight motivates many rock and metal drummers to use 20 to 24-inch kick drums and 12 to 18-inch toms (Mynett 2017). In metal music, shells are also increasingly triggered and sample-reinforced, even in the rehearsal room, so that the acoustic sound of the natural kit is gradually replaced by a studio-produced aesthetic (D. Williams 2015). The cymbal preference is also likely to vary between genres. There are no set rules, but more 'funky' styles can benefit from splash cymbals—smaller crash cymbals with a shorter decay time—while drummers of 'harder' genres tend to make frequent use of china cymbals, which are a more penetrating version of crash cymbals. Similarly, metal drummers might choose a heavier ride cymbal with a clearly defined short 'ping' that remains transparent in a dense arrangement. Jazz drummers probably prefer a light and 'washy' ride that fills out space in a trio ensemble. Keyboard players must decide whether they wish to have many sounds in one instrument, for example, analogue synthesisers, electric organs and stage pianos, or prefer specialised gear for specific sounds. Also, an instrument's playing feel depends on the kind of keys: they may be unweighted in synth-style or (semi-) weighted, reproducing the feel of playing the piano. While weighted piano-style keys

have a more differentiated touch response and may support the feel of a pop ballad, synth-style keys allow faster funky licks and slides. Hence, the need for certain sounds and the amount of equipment can vary depending on genre.

Over the last decades, many popular music genres have developed various sub-genres and sub-subgenres, which brought about diversification and specialisation of gear. 1950s rock & roll had a more defined band configuration of the drum kit, upright bass, piano, saxophone and vocals, and performers could choose from a limited number of available instrument models. Seventy years on, a djent metal band⁴ has a rock setup added with electronics (Marrington 2017), and the band members can pick from a multitude of different electric and bass guitars, amplifiers, effects, drum kit configurations and vocal microphones. Equipment that works for djent, for example extended-range guitars with seven or eight strings (Gil 2014), may not fit other genres of rock and subgenres of metal. Therefore, musicians playing different substyles of a genre may need to invest in different equipment suitable for each style. If musicians play various genres of a fundamentally different aesthetic, the need may be amplified. Stylistic flexibility is an interesting element concerning GAS; musicians, who want to realise their full potential in a genre, will most probably expand their instrument collection. However, it could also be tempting to buy more gear to avoid the effort of getting the most out of the current setup.

The discussion of genre conventions in terms of aesthetics and gear touches on another essential variable, the question of uniqueness and individual sound. As Théberge (1997: 191) states:

musicians today (as well as critics and audiences) often speak of having a unique and personal ‘sound’ in the same manner in which another generation of musicians might have spoken of having developed a particular ‘style’ of playing or composing. The term ‘sound’ has taken on a peculiar material character that cannot be separated either from the ‘music’.

Besides the two main elements of making music before a recording can take place, performance and composition, sound quality has become increasingly important. As the mediating element, the sound transports the performed composition to its audience (Gay 1998). Théberge (1997: 186) goes on saying that ‘a concentration on the “right” sounds for a given musical context can shift the musician’s attention away from other, more familiar levels of musical form, such as melody, rhythm, and harmony’. Consequently, the material need for good tone in the form of gear has gradually gained importance, a trend unbroken since Théberge’s writing more than twenty years ago. Just as a singer’s timbre can be their main appeal, an instrumentalist’s unique sound can attract an audience. To give one example: Tom Morello’s

⁴ Djent is a progressive subgenre of metal, defined by its ‘virtuosity and complex rhythms’ and a ‘characteristic guitar timbre’ (Marrington 2017: 260). It was named after an onomatopoeia based on the highly distorted, low-tuned and palm-muted guitar sound.

creative use of guitar tones and effects demonstrates a less conventional kind of expressiveness that has made him popular amongst guitarists, some even seeing him as the greatest revolutionary since Eddie Van Halen (Rensen & Stösser 2011: 217ff). However, the distinctiveness of sound is not as easily perceptible as that of the voice. If musicians in the audience play the same instrument as the performer, they will probably be more aware of the sound's uniqueness than players of other instruments or an audience of non-musicians.

The demand for a unique and personal sound is conflictual. On the one hand, genres have an expected aesthetic with varying tolerance for disregarding it. To match acoustic requirements, genre-specific instruments and sounds have become established (Herbst 2019b). On the other hand, artists are expected to be original and have a unique sonic signature, which is perceived as a mark of quality (Zagorski-Thomas 2014: 66ff). There are diverse ways to fine-tune sounds of the instruments used in popular music. Electric guitar and bass tones can be shaped by carefully combining the instrument with selected amplifier(s) and effects devices. Acoustic drum sounds can be varied by changing drumheads, adding cymbals and percussion pieces, and electrifying the whole kit or parts of it. Keyboard and synthesiser sounds can be designed from scratch and modulated for artistic effect. Moreover, it has become possible to create or refine the sounds of all the discussed instruments on a computer. Software such as Native Instruments' Guitar Rig provides access to numerous amplifiers and effects that can be combined in multiple ways with high control over signal routing. Although the name of the software implies the guitar as the target instrument, it can also be used for basses, keyboards and other application, including music production. For keyboards, some bundles authentically emulate vintage synthesisers, organs and pianos, such as Arturia's V-Collection. Furthermore, innovative software synthesisers like Xfer Record's Serum or Native Instruments' Massive define the sound of modern electronic music. These instruments are either controlled with a MIDI keyboard or programmed with a mouse. Electronic drums can be based on hardware sampler engines or software, and acoustic drums can be extended by electronic sounds with special pads or by using trigger devices. In the 1980s and 1990s, powerful computer processors brought about keyboard synthesisers and drum machines. More recently, hybrid analogue and digital systems and digital signal processing have opened up vast opportunities for tone shaping, making it possible to create individual sounds for all instruments used in popular music. Bennett (2017: 54) already observed in the 1980s the common 'religious quest' of musicians to combine the right equipment to meet their expectations and needs. Now, forty years later, the fine-tuning and specialisation of gear has become considerably more fine-grained due to greater control over sound settings and the vast range of consumer goods available.

As has been argued, musicians have benefitted from an increased range of instruments and options of customising and combining gear. To what extent musicians

customise their equipment in practice is unclear. Théberge (1993: 248) believes that there are two types of keyboard players. One group appreciates the improved functionality of synthesisers, while the other group feels overwhelmed and looks for pre-set sounds that work right away. The latter can be referred to as ‘push-and-play-people’, a market term by manufacturers to describe ‘people who do not want to get very involved in the technical aspect of recording and music-making, but who do want to perform or create music’ (Jones 1992: 85). According to Jones, 90% of musicians belong to this group. Yet, equating ‘push-and-pull’ musicians with amateurs is too simplistic (Jones 1992: 86); they are represented in all status groups, from beginners to professionals. Some musicians do not have the time to experiment with equipment or do not want to invest in it:

When I look at a synthesizer, I go for the presets. If the presets aren’t happening, I don’t want it. I don’t have time to be fooling around. I just want to punch through some stuff, hit a sound, and say, ‘Oh yeah. This is it.’ I mean, people get paid at the factory to put programs in it ... I’m not getting paid to get sounds out of a machine. I’m paid to make a record. (Jam as cited in Doerschuk 1987: 80)

This statement comes from Jimmy Jam, producer of internationally successful artists such as Janet Jackson, Mariah Carey and Chaka Khan. Since stock presets are usually created by highly skilled professionals, they are unlikely to be inferior to customised settings. As Jones (1992: 87) points out, ‘push and play’ does not prevent musicians from producing innovative sounds. One way to use presets is to blend standard sounds unconventionally. Yet, the main reason why Jimmy Jam relies on presets is the workflow in the studio. Efficient working habits contribute to creativity and low costs (Herbst 2021). Musicians who are not under time pressure can choose to spend more time optimising their sound, either as a long-term ‘investment’ or for experimentation. How this situation has changed over the past twenty years is not clear. It may well be that musicians have increasingly adopted customisation of sounds and instruments so that it has become standard practice in music-making. Yet few signs point to it. Inventor Christoph Kemper reveals (Herbst 2019a) that guitar players rarely use the powerful sound shaping functions of profiling amplifiers, a relatively recent technology that sits between valve amplifiers and emulation. In chapter 3.2, we will discuss whether this reluctance of guitar players to explore drastically different sounds is possibly due to a deeper, instrument-specific ideology.

So far, we have mainly been concerned with the aesthetical motivations for the choice of gear. Playability is another reason for selecting an instrument. Its physical properties are the main determinants of playability, accompanied by secondary aspects such as functionality. Often overlooked is the influence tonal quality has on playability and expressiveness (Herbst 2016), which can differ between instruments and take various forms too. Sounds require a reaction and therefore affect the choice of notes, as keyboardist Starr Parodi emphasises:

Sounds really make you play a certain way. If you have a little, dry, ticky-type sound, you might not take the soaring solo that you would with a different sound ... I really think that sounds inspire you ... If you get a keyboard that has an interesting sound, you don't have to play a lot of notes on it. The sound takes over. (Parodi as cited in Théberge 1993: 264)

During improvisation, reaction to sound is strongest. But even if musicians have a composed lead line or solo, the sound can be set up in advance to best support musical intention. It may require adding effects or changing sounds fundamentally during a solo.

The guitar is another instrument where the choice of model and tonal subtleties significantly impacts expression. According to Dire Straits guitarist Mark Knopfler:

If you take your song and change the key or the instrument that you play it on, or you pick up something else and do it a different way, very often the instrument will dictate something new to you. It's the difference between sitting down with a piano and sitting down with a guitar, or sitting down with a Spanish guitar as opposed to an electric. I often find that what I've written can yield something else. Even a different string gauge can create something completely different. Very often I've found that if I'm playing something with very heavy strings, I'm not bending them, and it leaves room for something else to happen. (Knopfler as cited in Blackett 2019)

Knopfler stresses the effect a sound can have on composition and arrangement, but he also hints at consequences for playability. The guitar's natural characteristic is staccato (Weissberg 2010: 99f); notes cannot be sustained as easily as on a piano, nor can they be connected as fluently as on a bowed string instrument. Adding distortion increases the guitar's sustain and allows the performer to modulate it like a voice (Jauk 2009: 268f) or a violin (Middleton 1990: 30ff; Walser 1993: 63ff). It smoothes the sound through compression and masks lacking synchronisation between the fretting and picking hand, which makes it easier to perform fast solo lines (Herbst 2017c). Distortion further brings out characteristics of distinct playing techniques like artificial harmonics. It enables, for example, responding to playback feedback, which is not possible on an acoustic guitar. Sound quality can be inspiring, both in melodic phrasing and in songwriting. Mark Knopfler points out that compositions written on the piano differ from those written on a guitar. Choosing different instruments for composing affects harmony, especially with keyboard instruments allowing for more sophisticated voice leading and complex chords. But even the different sound qualities of a single instrument influence creative choices, as Billy Gould, guitarist of Faith No More, explains:

Every amp has its own strengths and weaknesses and you learn how to play to these amps ... And what you can do, is you can start writing and using the strengths of the amplifier, where it sounds better on certain chords than on other amps. When I

write now, I write using those characteristics, the character. (Gould as cited in Herbst 2021)

Compared to the electric guitar, an acoustic drum kit's sound impacts performance behaviour less. Using microphones or trigger clips to amplify or extend the sound still contributes to a better playing feel. For example, compression can compensate for volume irregularities or produce powerful volumes in fast sections. This dynamic range reduction is crucial for the fast double-kick playing common in modern metal genres (Mynett 2017). But even today, rhythmic quality cannot be manipulated and controlled in a live performance the same way as in the studio, where there are multiple post-processing possibilities.

All these previous discussions highlight the strong connection between genre aesthetics, the performer's individuality and a setup's playability. The material component of music-making has become ever more important, requiring musicians to possess more gear and to become masters of its sonic potential. Hence the understanding of playing and the definition of playing skills have changed because both must include technical efficiency more than ever before. As Théberge (1993: 190) argues, innovations in musical technology and the specialisation of musical genres have led to a 'general blurring of distinctions between musician and technician, amateur and professional'. A musician's role more and more entails the role of a technician or technologist because they are increasingly expected to engineer their sound on stage and recordings. Moreover, musicians might wish greater control over their sound as they progress in their careers (Herbst 2021; Herbst & Albrecht 2018).

Until now, we have concentrated on matters related to playability and wider conventions associated with genre or music history. There is also the social component which is easily overlooked. The discussed relevance of an individual sound and originality touch on social aspects, as they situate the performer in a broader context. Nowadays, the virtual community of musicians on online and video platforms can put pressure on a musician to live up to expectations (see Herbst & Vallejo 2021). The immediate social environment—local music scenes and bands to which the musicians belong—can also influence how a musician deals with gear (Bennett 2017). Little research has concentrated on the gear-related effects of social units like a band. From a holistic viewpoint, the best musical result will be achieved when all band members jointly decide on what gear to use. Acoustically, instruments must complement and support each other to create an intelligible and expressive ensemble sound. Aesthetically, equipment choice is inseparably linked to an artistic concept and therefore decisive for the overall effect. However, this whole concept is sometimes difficult to achieve if band members have different musical preferences or do not understand acoustic principles. Ambitious bands with technologically minded members carefully select their instruments for certain songs and adjust amplifier and effects settings to support their artistic message. Depending on the ensemble's stylistic breadth, matching requirements of certain songs with optimal gear may require an

extensive gear collection across the band. That is why purchases within the ensemble should best be strategically discussed to work towards a more effective collective sound. From a GAS point of view, purchases by one band member may trigger fellow musicians to follow suit. Such a process can be musically motivated, for example, to better complement the sound of new gear, or psychologically motivated. A bandmate's purchases could be envied and encourage experimentation with new equipment.

3.2 Vintage, Nostalgia and Innovation

The previous discussion highlighted the relevance of specialist music equipment from a musician's perspective and presented examples of why musicians wish to invest in equipment. Some of the reasons found were conforming to genre conventions, creating a unique personal sound and improving the playability of one's setup. But as has already been indicated, the choice and handling of gear are not only determined by musical reasons; musical instruments are a rich symbolic terrain (Frith 1986; Théberge 1997; Waksman 2003).

Before, we have discussed musical reasons why musicians choose older instruments or artificially aged gear. Our elaborations on vintage musical equipment indicate that its popularity has been maintained for a long time, and there is no reason to believe this will change anytime soon. Influential musicians like Eric Clapton, Jimmy Page, Tony Iommi and Geezer Butler played some of the most popular guitar and bass models manufactured by Fender and Gibson in the 1950s and 1960s. Subsequent generations of artists such as Saul 'Slash' Hudson, John Sykes and Doug Aldrich were inspired to play the same models and, if available, from the early years of manufacture. Other players in the late 1970s and 1980s, such as Eddie Van Halen, George Lynch and Gary Moore, experimented with amplifiers and guitars, contributing to the development of new instrument technologies used in modern forms of rock and popular music. In the late 1980s and early 1990s, two interest groups became more common than they were in previous decades: one valuing innovation and one vintage gear. Towards the end of the 1980s, specialist magazines for vintage equipment emerged. In 1986 the North American *Vintage Guitar* magazine was launched, dedicated to vintage fretted instruments (guitar and bass), amplifiers, effects and other accessories. It included stories about established players, interviews with classic gear manufacturers and workshops by luthiers on refurbishing ageing instruments. Two years later, in 1988, the first vintage drum magazine, *Not So Modern Drummer*, entered the American market. It pitched itself as a 'treasure trove of information about vintage drums, custom drums & legendary drummers'⁵ similar to

⁵ www.notsomoderndrummer.com; accessed 16 September 2019.

Vintage Guitar. Another magazine was *Vintage Drummer* (2001–2005), which was renamed *Classic Drummer* in 2005 to shift the focus of vintage drum and gear to ‘artists of any era who played in a feel-based classic style’.⁶ There was no equivalent magazine for keyboard instruments with a vintage focus. *Keyboard* magazine (since 1975) occasionally covered old instruments. Still, it was not until 1993 that it published a dedicated book on vintage instruments—*Vintage Synthesizers: Ground-breaking Instruments and Pioneering Designers of Electronic Music Synthesizers* (Vail 1993). This book finally dealt with renowned analogue synthesizers from 1962 on, developed by pioneering manufacturers such as Moog, Buchla, EMS and ARP. It included interviews with artists such as Keith Emerson and Wendy Carlos. However, most print keyboard magazines were mainly interested in the latest technologies, and discussions about vintage gear took mostly place in online forums that emerged in the 1990s. At this time, other vintage instruments like the Rhodes piano also began to arouse interest.⁷ But still, a long time passed until an ‘analogue revival’ began to shape the keyboard world more generally by the turn of the 2000s (Pinch & Trocco 2002: 317ff). Overall, the continuing popularity of replicas of older instruments, not only for guitars, drums and basses but also for synthesizers, indicates that vintage gear is not a short-lived trend but rather reflects the desires of many musicians of various instruments for more than two decades by now – similar to the general interest in older popular music from the 1960s to the 1990s (Reynolds 2012). Indeed, Bennett (2017: 55f) observes that musicians in the early 1970s were most interested in instruments from the early 1950s because they believed in the better quality of older fabrications. The appreciation of older devices seems to be a widespread phenomenon among musicians that occurs independently of specific instruments or generations.

In Western societies, novelty and, as a result, technological progress, are generally regarded as beneficial to creative practices (Niu & Sternberg 2006). Any technological innovation is viewed positively. Taylor (2001: 1) considers the advent of digital music technology the ‘most fundamental change in the history of Western music since the invention of music notation in the ninth century’. In a similar vein, Jones (2006: 19f) asks how anyone could be ‘against’ technology in the face of its ‘unprecedented and ubiquitous force’ and universal impact. Those rejecting novel technologies like the ‘neo-Luddites’ do so as a conscious symbolic act. How this can

⁶ www.classicdrummer.com/contact; accessed 16 September 2019.

⁷ There is little research on the interest in vintage keyboard equipment in popular music. Our perception is based on a cursory analysis of keyboard magazines like *Keyboard* and *Keys*. The impression we got was confirmed by keyboard expert Immanuel Brockhaus. He is investigating cult sounds in popular music in an ongoing research project. Results are available on the project website (<http://www.cult-sounds.com>) and published in a monograph (Brockhaus 2017).

take form becomes evident in the practices around vintage instruments. In the field of record production, several studies have discussed the oversimplified view of technological development as progress. Barlindhaug (2007: 75) points out that new production technology, despite its increased functionality, does not just replace older gear. Likewise, Bennett (2012) argues that analogue recording equipment has tangible advantages over digital tools beyond their mere iconic value, mythology and romance, for example, easier maintenance and more ergonomic workflow. In music production and music technology more generally, including musical instruments, both tradition and innovation have their place, and both can coexist and fulfil distinct functions (Negus & Pickering 2004: 91).

Discussion of affordances and attitudes towards analogue and digital equipment for various instruments requires a theoretical understanding of innovation. From a sociological perspective, Braun-Thürmann (2005: 6; our translation) understands innovations as ‘material or symbolic artefacts that observers perceive as novel and experience as an improvement over the existing’. Innovations do not come from nowhere. They are usually based on the application of a new idea to an existing product. Thus, even when innovations are advertised as a novelty, they build on existing technology but add quality or extended functionality (Taylor 2001: 7f). Just like music technology, innovations are always integrated into a social system. As an *interactive* product, innovations only become real when a second party experiences the product as innovative and bases its actions on it (Braun-Thürmann 2005: 6). In his influential work *Diffusion of Innovation*, Rogers (2003) points out the high degree of uncertainty for the individual that must be overcome before an artefact is evaluated as an improvement and finally adopted. To convince an individual, an innovation must fulfil five criteria in Rogers’s theory (2003: 15f). The most fundamental one is the ‘relative advantage’ that new technology must provide. Taking the keyboard as an example, more advanced electronic circuits and increased memory and hard drive space allow more realistic sounds and larger sound libraries. Another core criterion is ‘compatibility’ with existing values and past experiences. For musicians whose convictions are fundamentally opposed to digital technologies, their ‘relative advantage’ over analogue gear must be significant to make them adopt a digital device. A third core criterion is ‘complexity’, the ease of use. The final two criteria are secondary for an innovation to be adopted. ‘Triability’ is the opportunity of trying out, and ‘observability’ concerns the degree to which its use is visible to others.

Players of different types of popular music instruments vary significantly in their views on analogue and digital equipment and their preferences for either vintage or cutting-edge musical gear. Distinguishing analogue from digital and innovation from tradition is rarely black and white. Théberge (1993: 278) emphasises the role of digital signal processing power and falls into the trap of equating guitar players with keyboardists:

‘effects’ such as delays, flangers, reverbs, and the like, have come to be thought of as inherent properties of a sound (and this is as true for guitar players, who process their guitar sounds through an array of footpedals and special effects devices, as it is for synthesizer players) and virtually all contemporary keyboards now contain sophisticated digital effects units built directly into the instrument.

He makes no distinction between keyboards, synthesisers and guitars regarding effects, claiming that all benefit from technological advances. Since most keyboard instruments are digital, better processing power allows more oscillators or other sound generators such as wavetables, higher sampling rates and bit depths, besides a more complex rendering of reverb and modulation effects. Consequently, advances in computing power and technologies that extend the functionality, such as synthesis and sampling, improve keyboard instruments. With synthesisers, it may be the same but not necessarily so. Technological advances in *digital* synthesis since the advent of early models such as Yamaha’s frequency modulation synthesiser DX7 (1983), with its cumbersome interface, have improved parameter control. Better computer memory (RAM) has increased the complexity of early wavetable synthesisers like PPG’s Wave (1981) by a higher number of wavelets, improving the general audio quality. Similar improvements ensuring better quality and controllability apply to early vector synthesisers like Sequential Circuits Prophet VS (1986). Newer forms of synthesis, such as the processing-intensive physical modelling synthesis at the heart of popular instruments like the Nord Lead keyboard (1994), would not have been possible without enhanced computational power. All these technological advances have provided a variety of positive effects. They increased the instruments’ audio quality, functionality and number of oscillators, filters and polyphonic voices without any disadvantages. According to Rogers’s (2003) theory, these improvements are all ‘relative advantages’ because they improve an instrument’s sound, adjustability and usability.

Analogue synthesisers have benefitted differently from technological advances. Buchla and Moog’s early synthesisers were purely monophonic, which frustrated keyboard players used to polyphonic instruments such as organ and piano (Théberge 1997: 52). Introducing polyphony and increasing the number of voices on synthesisers during the 1970s improved the instrument’s functionality, sound design options and playability. Other enhancements include the portability and handling of new devices like the Minimoog (Théberge 1997: 52), modular designs affording more detailed sound design, and the introduction of a pattern sequencer as in the case of Buchla’s Music Box Series 100 (Pejrolo & Metcalfe 2017: 13). Compared to digital keyboard instruments, these analogue synthesisers are valued for their tactile controls (Pinch & Reinecke 2009: 156f). All parameters are accessible in the form of knobs and sliders, making it easy for musicians to manipulate sound while playing (Pinch & Trocco 2002: 224). From the beginning, live sound manipulation was an essential part of the performative expression of synthesisers (Barlindhaug 2007: 81),

which was lost with digital keyboards that allowed quick switching between fundamentally different sounds at the touch of a button. According to composer Brian Eno, ‘muscular activity’ was replaced by ‘mental activity’ during the transition from analogue to digital keyboard instruments. Others like Taylor (2001: 97) see the main difference in ‘agency’, arguing that analogue gear allows greater control. However, digital keyboard instruments offer similar means of control over sound parameters that go beyond analogue gear, even if they are less intuitive and therefore possibly less attractive to musicians, according to Rogers’s criterion of ‘complexity’ for adopting an innovation.

The introduction of digital synthesisers was, above all, a fundamental split in sound aesthetics and conception: analogue synthesisers offered more organic and individual sounds, digital keyboard instruments better functionality (Pinch & Trocco 2002: 318f). Analogue synthesisers were valued for their warmth and transparency of signal flow (Théberge 1997: 119), so further technological development was considered not as crucial as for their digital counterpart. Therefore, affordable remakes of classic analogue synthesisers tend to be more popular than newly introduced synthesisers with innovative features (Pinch & Reinecke 2009: 156f). This situation is similar for guitar players, who Théberge also included in his assertion about advances in effects technology. He is right in saying that for *some* players, effects are a relevant or even crucial part of their sound. However, guitarists throughout history have been divided over digital technology. Digital effects were popular when they were new in the 1980s, with guitar players exploring modern rack setups with hybrid amplification using valve and transistor technology (Maloof 2004). Yet in the 1990s, most guitarists returned to simple, traditional setups that consisted of an amplifier (combo or stack) and pedalboard, commonly all analogue (Herbst 2019b). Indeed, musicians’ growing interest in low output valve amplifiers and the rise of such offers indicates an increasing preference for classical sounds of the 1960s and 1970s (see also Reynolds 2012). A small group of guitar players tolerant of change showed considerable interest in advanced modelling, simulation and profiling technology for amplifiers and effects (Herbst 2021). Nevertheless, progress in guitar technology has not yet been widely appreciated, especially when it comes to digital systems (Herbst 2019a; Herbst et al. 2018). Even for players open to digital equipment, amplifier simulations are often out of the question (Pinch & Reinecke 2009: 163). Gay (1998: 87), in agreement with Taylor (2001: 97), argues that less complex analogue gear gives guitar players a sense of agency, while Pinch and Reinecke (2009: 163) observe that digital guitar amplifiers make it challenging to find the sweet spot and that they lack individuality. According to the beliefs of the interviewed guitar players, it is the

imprecision and parts that don’t quite work properly which give these old instruments and equipment their special value ... In a way, this is reminiscent of the value placed upon instruments before the age of mass production and electronics,

when each individually crafted instrument with its own idiosyncrasies of sound and action were what people valued. (Pinch & Reinecke 2009: 163)

Given the high degree of control over sound parameters and the sonic authenticity of modern digital amplifier simulations, these views and reasons say more about the cultural values players associate with technology than about its musical suitability. Crowdy (2013) suggests that musicians tend to make claims about equipment based on their attitudes and beliefs rather than on facts or the listening impression. Often,

the aural differences are so subtle that most people are unable to actually hear them. Here we have sound aesthetics effectively acting as a proxy for other areas of opinion and value. These may include appearance, usability, brand loyalty, peer pressure and justification of expense. (Crowdy 2013: 152)

There seems to be an implicit understanding amongst guitar players that analogue gear is more suitable for the skilled player (Herbst 2019b). Interviews with guitarists conducted by Pinch and Reinecke (2009: 158) indicate a widespread practice of amateurs familiarising themselves with vintage gear through listening and practical experimentation, often under the guidance of more experienced players. Individual preferences for non-mainstream technologies and instruments are difficult to maintain due to the strong influence of social expectations within the guitar scene.

With a drum set, the distinction between the traditional acoustic kit and the modern electronic set is less clear. Electronic drums are becoming increasingly common for reasons of affordability, lower volume, smaller size, various selectable sounds and the fact that they require neither tuning nor maintenance (Bache n.d.). But generally, they are not regarded as an improvement or even an adequate replacement of an acoustic kit; they serve different purposes, be it for live or studio work, for practising or touring, or as a primary or additional instrument (Andertons n.d.; Bache n.d.). For musical reasons, most drum guides still present the acoustic kit as the ‘real deal’ and recommend an electronic set to drummers interested in electronic genres. That points to acoustic drummers not benefitting from technological innovation to the same degree. In contrast, electronic drummers do so from better audio quality such as high-resolution samples, improved accuracy and velocity in terms of dynamics, and generally from larger instrument libraries.

While keyboards and digital synthesisers are prone to becoming outdated, Théberge (1993: 178) reasons that ‘the discourse of “vintage” instruments is a strategic one: it helps to counteract the fear among many consumers of new technology that their purchases will become obsolete and worthless’. This concern is likely to be specific to digital keyboard instruments, guitar amplifier simulations, effects units and potentially electronic drum kits, as limited computational power and hard drive space negatively affect sound quality. With analogue equipment as guitar amplifiers or subtractive synthesisers, sound quality is negatively affected by a complex signal path; from a technical viewpoint, the quality of a simple signal path is superior (Gay

1998). Innovation rather concerns the adjustability of sounds, such as expanding the amplifier's filter section with resonance and presence controls, which were increasingly added to devices in the 1970s (Herbst 2016: 36).

Little empirical research has focused on the attitudes of players of different instruments towards their gear. Electric guitarists have been researched the most. Herbst's (2016, 2019b) study demonstrates that guitarists commonly appreciate traditional equipment and that players of more modern or 'extreme' genres such as metalcore or nu metal tend to deviate from this general pattern. The study also finds that guitarists have only little interest in experimenting with equipment, for example, by comparing guitars, amplifiers and effects pedals. An innovative sound was generally not overly relevant, although the sound quality was of the highest importance. This finding supports the notion that guitar players tend to care much about their sound, but that originality, as Théberge (1997: 191) suggests, is not the top of their priority list. The answers regarding attitudes and preferred equipment instead suggest that many guitarists intend to conform to genre aesthetics, and apart from some modern or experimental genres, most genres rely on classic instruments, amplifier models and pedals. In summary, we can safely assume that most guitarists are tradition-conscious, consistent with the popularity of vintage equipment among them.

In their study of the guitar as an artefact and icon, Ryan and Peterson (2001: 104f) identify three types of vintage buyers. The first type is the successful professional musician who has the money to purchase expensive equipment and the skills to use it. The authors do not explain what specific skills are required to 'operate' vintage instruments. One can guess that for keyboard instruments, the ability to handle complex routings of modular synthesisers is required. Guitar skills are likely the mastery of accurately responding to the tone produced by a low-output pickup in combination with a low-gain amplifier because such a tone does not mask a weak playing technique (Herbst 2017c). The playability of drums and basses seems to be less affected by the vintage quality of instruments, apart from the consequences for maintenance. The second type of vintage buyer are collectors who either wish to systematically complement a collection or see the purchase as an investment, speculating that the instrument will eventually increase in value. The third type is the non-professional player; most vintage buyers belong to this group. Their motivations range from owning a high-quality instrument with aged material to speculative investment. In discussing vintage guitars, Ryan and Peterson (2001: 110) claim them to be less popular with younger generations. Contesting the idea that vintage instruments are of better quality per se, younger players stress these may be noisy and subject to unpredictable production standards. They also argue that inflated prices deter younger musicians. Besides, some of them might be less excited about old instruments when their idols play more modern gear to achieve a contemporary sound. This theory accords with Shuker's (2010: 102) claim that vintage guitars are aimed at an age group over thirty.

Nostalgia is another potential motivation for buying and honouring vintage gear. Boym (2001) distinguishes two forms of nostalgia that are useful for understanding the popularity of vintage instruments: *restorative nostalgia* and *reflective nostalgia*. Reflective nostalgia is about a person's biography, while restorative nostalgia is concerned with the past more generally. Drawing on Hobsbawm and Ranger's (1983) theory of 'invented traditions', restorative nostalgia is about preserving 'truth' and 'tradition'. It comprises the genuine restoration and preservation of history and origin, and it further involves a longing for temporal distance, which it satisfies by an 'intimate experience and the availability of a desired object' (Boym 2001: 44).

In the practices relating to vintage instruments, there are several forms of restorative nostalgia. For the individual musician, authentic vintage gear or authentic replicas are a direct link through a physical object to a previous time in music history that can be valued for multiple reasons. According to Th  berge (1993: 178), "vintage" instruments are understood to give the player a form of direct sonic (and sometimes iconic) access to the past and, thereby, an almost magical ability to evoke the power of some past music'. This nostalgic longing seems to be a reason why guitar and bass players appreciate instruments from the 1960s and 1970s. Feature stories in magazines indicate that many regard this period as the heyday of rock music, in which innovative players like Jimi Hendrix, Jimmy Page, Eric Clapton and Gezeer Butler became role models for future generations of musicians (see also Reynolds 2012). This phenomenon is not bounded to modern players. For example, Aerosmith's Joe Perry bought a Les Paul guitar because Jeff Beck played one, and Rolling Stones' Ron Wood chose a Gibson guitar because of Elvis Presley (Ryan & Peterson 2001: 99). A guitarist in Pinch and Reinecke's (2009: 164) study has a shelf of books about the history of instruments in his studio so that he can feel a 'connection to the past playing a real instrument from the past, I can imagine the people who might have played it before me'. At all times, musicians have been attracted to older instruments played by esteemed musicians to connect with them and to feel part of a culturally meaningful community.

For more recent musicians, the appreciation of early rock music harbours romantic notions of authenticity because the setups of that time were simple, all analogue, rarely amplified by a PA system, pure and thus 'good' in the ears of musicians who value vintage instruments. Hence vintage gear fulfils the romantic promise of the good old times in history. Music was 'authentic' because it was handmade, skilled, serious and as little mediated as possible. In contrast, pop music since the 1980s embraces a modernist ideology that celebrates the affordances of newer technology to shape music drastically beyond human performances (Keightley 2001). Characterised by an imagined 'golden age' that may have never existed (McCracken 1986), early rock music is still idealised. Furthermore, the playing skills of renowned musicians such as Jimi Hendrix are celebrated to the present day (Herbst & Vallejo 2021). Playing an authentic vintage instrument of that time or a relic model is linked

with the hope that part of the power is in the device itself and flows straight into its player (Lévi-Strauss 1963). Such superstition becomes evident from a statement by Joey, a successful guitarist in the 1970s and 1980s, interviewed for Fernandez and Lastovicka's (2011: 292f) study on fetishes in contemporary consumption:

I pick up the '54 Strat[ocaster] and I'm channeling Buddy Holly because that's [just like] the exact guitar he played, same year, same everything, same finish. So in a way it becomes the soul of the [original] guitar in my mind, I don't know where this guitar has been, obviously it's not Buddy's.

The mere thought that the instrument could be a 'sibling' of Buddy Holly's original guitar has symbolical value for its player. Guitarist Joey is aware that the 'magic' is only imaginary, while from other interviews, it is less certain to what extent players believe in the magic of an instrument. When asked about his dream guitar, Artie, another player who participated in the study, replied: 'the one Billy Corgan [lead guitarist of the Smashing Pumpkins] played... maybe his genes rubbed off on the fingerboard [of the guitar] and I might pick them up a bit? ... I don't know, just because it was his'. Fernandez and Lastovicka (2011: 282) argue that Artie genuinely believes that the original guitar Billy Corgan played would improve his performance due to 'contagious magic'. Drawing on Belk's theory of fetishes as 'magical objects' (1991: 28) with 'magical power' (2001a: 61) and 'magical aura' (1996: 81), Fernandez and Lastovicka (2011: 279) argue that this effect is not limited to instruments owned and played by the esteemed artist but also occurs in mass-produced replicas.

A strong motivator for restorative nostalgia is the prospect of reliving a musical time of the romanticised past that players may not even have experienced themselves. On the early stereo records between 1965 and 1972, mixes were often not yet symmetrical (Moore & Dockwray 2010), so their listeners can switch off the instruments that are just on the left or right channel. That allows hobby musicians to play the muted instrument part along with the original band. The nostalgic reliving of the experience and the feeling of being part of the ensemble become even more authentic when a similar setup to the original is played. The emotional impact of such an experience is demonstrated by guitar player Jack: 'wow ... I sound just like him! And I tell you, it's quite a magical feeling. You know, to blend in with this group whose music you love so much and you hold them in such high-esteem. You know, to be part of it' (Fernandez & Lastovicka 2011: 286). Playing along to a record with an authentic vintage instrument increases the authenticity of the arbitrary situation whereby the nostalgic experience reaches a new level as the player takes the position of a band member (Fernandez & Lastovicka 2011: 286f).

Restorative nostalgia is based on a collective appreciation of influential musicians, the instruments they played, references to specific years of their production as well as reissues. Joey, the guitarist with an international career mentioned before, is an excellent example of this:

This is my 1969 [Gibson] Les Paul Gold Top—the first really good guitar I ever had it's taken me around the world. I bought 'Goldie' brand new at Guitar Heaven [after I] scrimped and saved money from gigs and went down there with \$450 ... and picked this one out and it was like the kind of guitar that you put it in your hands and it plays itself. I just knew it was the right one ... I [had] looked at my Rolling Stone books and saw that a 1959 [Les Paul] Gibson is what Keith Richards played a lot. Those 1959 Les Paul guitars are like the Holy Grail! ... I just knew it was the right guitar for me [because it is] pretty much a really good reproduction of the way the Les Pauls were in the 50s and this was the first time they reissued them ... So it represented success, you know, real musicians. This was the unattainable, what you reached for ... the star power it represented ... It's a very special guitar and whenever I bring it out onstage now I feel like I'm nineteen again, suddenly I'm the kid ... onstage opening up for Led Zeppelin with this guitar. (Fernandez & Lastovicka 2011: 285)

This quote sheds light on several motivations. It shows the glorification of a guitar model from a particular year that is considered the 'holy grail', and it is linked to a personal icon. From his perception, the models from 1969 equal those of 1959, which may or may not be the case. More importantly, Joey's perception of some 'magic' or 'aura' results from symbolic links. The belief in these symbolic links is meaningful even for a successful artist like Joey who trusts that the aura benefits his performance.

The strong symbolic power and value that restorative nostalgia lends to vintage instruments make it convenient for the musical instruments industry to capitalise on tradition-conscious musicians. According to Uimonen (2016: 121), vintage instruments are 'perfect examples of the past which needs to remain untouched, pristine, and uncontaminated not only for collectors but also for the guitar manufacturers who curate their history and recycle their designs for contemporary production'. Precious items are not only authentic vintage instruments from a particular time but also relic or heritage models besides accessories and signature instruments, even those of deceased musicians who received them post-mortem. Such instruments seem to attract musicians, although most players understand that the 'magic dust' is just imagined.

The second form of nostalgia in Boym's (2001: 49f) framework is *reflective nostalgia*, which focuses on a person's biography. Memories are preserved as 'perfect snapshots' of cherished experiences. Reflective nostalgia is not concerned with 'truth' and 'tradition'; its narrative is 'ironic, inconclusive and fragmentary' and often humorous. Amongst musicians, it may take the form of holding on to the first instrument one owned or trying to reacquire the model once sold because positive memories are associated with it. This kind of nostalgia is reflected in a statement of Joey when talking about 'Goldie', the guitar he played on some of his big hit records in the 1970s and 1980s:

When I'm up on stage, when I take out Goldie on stage I become that guy when I was 19, I play *different!* Lenny [a long-time collaborator] says, 'you play different on that guitar'—I say, 'I know!' because I'm channeling back to that era when I recorded 'My International Hit'—I'm suddenly transported to that year. (Fernandez & Lastovicka 2011: 292)

This guitar holds special memories of Joey's most successful time as a musician, and he associates his success with the guitar because it is the instrument on which he wrote his hits (Fernandez & Lastovicka 2011: 293f). Such longstanding and influential nostalgic feeling prompted Joey to create a web page for his guitar. It attracts a broad international audience, suggesting that other people receive this personal nostalgic object well. Maybe they see in 'Goldie' a connection to Joey's artist persona and his fame. Or maybe 'Goldie' sparks the hope that a special guitar will allow them too to write a hit one day, as it did for Joey.

Restorative and reflective nostalgia manifest themselves in numerous ways and influence certain groups of people. Restorative nostalgia is likely to affect all musicians, regardless of age and experience. Shuker (2010: 28) argues that young music collectors consume formats such as vinyl that are older than they are, just for the sake of 'musical authenticity' and 'romance of a nostalgic past'. The same is true for musicians who listen to music and artists older than themselves. This can awaken their interest in old musical equipment, genuine vintage instruments or gear based on them. Reflective nostalgia takes a different form. Due to the biographical component, it tends to occur among more experienced players, as Joey's example suggests.

Concerning GAS, it should be noted that '[n]ostalgia is not always about the past; it can be retrospective but also prospective. Fantasies of the past determined by needs of the present have a direct impact on realities of the future' (Boym 2001: xvi). Nostalgia can strike at any time and tempt a musician to acquire 'new' old gear. It triggers a process of improving the setup that may not end with only buying the instrument because a vintage guitar, for example, may require the right (vintage) amplifier and other accessories to guarantee the authenticity of the whole setup.

To conclude the discussion about tradition and innovation, it is crucial to explain the popularity of vintage instruments and the analogue revival not only as a consequence of dissatisfaction with the present but also as a nostalgic longing for an idealised past (see Reynolds 2012). Pinch and Trocco (2002: 318f), focusing on the synthesiser, see nostalgic longing more as a criticism of how this instrument has evolved, from complete control over the tone to sound charts and finally presets, bringing about reproducibility and creation of the same sounds. However, their 'technostalgia' for vintage gear should not be equated with a longing for past musical expression. Instead, it is a 'movement toward both new sounds and new interactions, whether aural, social, or physical, made concrete through combinations of the past and present' (Pinch & Reinecke 2009: 166). Technostalgia thus reflects the desire to

make new and modern music with ‘real’ instruments. For many musicians, regardless of what instrument they play, better sound quality and easier playability are the beneficial features making them prefer analogue over digital devices rather than the romantic notions of the past. As per Rogers’s (2003) theory of innovation, for those musicians who opt for analogue gear, digital equipment does not sufficiently meet the three most essential criteria of ‘relative advantage’, ‘compatibility’ with values and ‘ease of use’.

3.3 Special-Interest Books for Musical Instruments

To understand why specific instruments are more strongly associated with gear-related practices in common perception, we analysed special-interest books for the instruments included in this study. A search on Amazon UK with the term ‘music gear’ resulted in a list of more than 900 books. The most relevant ones to the search were on the electric guitar and, in much fewer numbers, recording equipment and practices. This search result is consistent with Becker (1996) and Wright (2006), who present electric guitarists as the instrumentalists most likely to show a pronounced interest in gear. After this exploratory search, we browsed through Amazon’s product offer of books on the respective instruments to get an overview of the educational and special-interest material available, reflecting the authors’ and publishers’ perceptions of which topics and practices are relevant to the respective instrumentalists. Studying the book titles and blurbs suggests different topics and varying relevance of gear for various instruments.

It met our expectations that of all instruments, books on the electric guitar focus on gear the most. With the acoustic guitar, this is less the case. In many instructional books, guides and manuals about the electric guitar, gear is omnipresent. It is usually mentioned in the blurb, if not in the title. The book *Beginners Guide to Electric Guitar: Gear, Technique, and Tons of Riffs* (Speed 2010) pitches itself by teaching ‘all about the different types of electric guitars, amplifiers, and effects’, followed by a list of renowned rock bands whose songs can be played once the right guitar sound is achieved. Carter’s (2016) *Electric Guitar Gear: A Complete Beginner’s Guide to Understanding Guitar Effects and the Gear Used for Electric Guitar Playing & How to Master Your Tone on Guitar* is even more gear focused. Considering that the book is intended to introduce beginners to the instrument, the blurb begins by pointing out how ‘daunting’ sound manipulation and ‘all the different gear’ is. The book undertakes to assist players in finding the right gear for their playing, control it and add effects to make them sound ‘more expressive and unique’. Holland’s (2013) *Guitar Gear FAQ* similarly intends to help less experienced musicians to ‘improve their tone, make better purchase decisions, and avoid many of the costly mistakes that are commonly made’. Even more revealing are two guides to worship music, one for the guitar and one for the bass. While the book for the bass—*The Worship Bass Book*:

Bass, Espresso, and the Art of Groove (Stockton 2014)—focuses on groove in the title, the book for the guitar—*The Worship Guitar Book: The Goods, the Gear and the Gifting for the Worship Guitarist* (Doppler 2013)—emphasises gear.

In addition to instructional guitar books, there are several other books dedicated exclusively to gear and setup. Some of them promise rare insights into the sound secrets of renowned guitarists. Fornandley's (2015) *Tone Wizards: Interviews With Top Guitarists and Gear Gurus On the Quest For The Ultimate Sound* contains a 'series of interviews that strives to dig deep into the various aspects of electric guitar tone and style' to unravel the elements of the signature sounds of 'some of the world's top guitar players', such as Joe Bonamassa, Peter Dinklage, Eric Johnson, Joe Satriani and Steve Vai. Similarly, Bruck's (2005) *Guitar World Presents Guitar Gear 411: Guitar Tech to the Stars Answers Your Gear Questions* gives rare insights into the sound of renowned players based on statements from their guitar technicians.

Another strand of guitar books equates mastery of gear with the dedication and commitment of a player. This equation becomes clear from the title of Hurwitz's (2013) book *The Serious Guitarist. Essential Book of Gear: A Comprehensive Guide to Guitars, Amps, and Effects for the Dedicated Guitarist*. It includes 'tons of photographs and illustrations, real-world explanations on how to achieve signature tones in a variety of genres, helpful tips on gear maintenance, and an in-depth overview of the landmark innovations in guitars and guitar-related technology from the 1930s to the present'. The deep understanding gained from Hurwitz's book should enable serious guitarists to 'unlock a signature sound that will set you apart from the crowd'.

The books presented here represent only a fraction of the books offered by major vendors such as Amazon. Nevertheless, our examples give indications that guitarists are viewed as technologically determined. The authors suggest that the guitarist's status, dedication and expressiveness depend primarily on their gear and how they tweak it for their individual use. Comparing the books about the guitar with those for other instruments makes this even more evident.

For the bass, several books contain transcriptions of signature grooves like that of the Red Hot Chili Peppers' Flea (Johnson 2004). It is different with the guitar because books tend to focus on both gear and playing, for instance, signature solo licks. Other books about the bass concentrate on rhythm sections, such as Slutsky and Silverman's (1997) *Funkmasters: The Great James Brown Rhythm Sections, 1960–73*. Yet the largest number of books focus on bass lines, grooves, playing techniques and harmony. Only one book explicitly includes gear, if only as a small part of various elements, Gordon's (2018) *Bass Player Q&A: Questions and Answers about Listening, Practicing, Teaching, Studying, Gear, Recording, Music Theory, and More*. The blurb describes the book as a guide to 'various music-related questions' and a comprehensive manual for hobbyists. It does not deal with signature sounds that are the focus of many guitar books. Although guitar and bass are related

instruments with similar equipment, the books as a whole concentrate on completely different areas: guitars on gear and basses on the groove.

Keyboard instruments must be classified as either electronic keyboards or synthesisers, and their books differ considerably. With a focus on sound design, the synthesiser books are much closer to guitar manuals. In comparison, keyboard and bass books concentrate on songs and playing. Most books for synthesiser players concentrate entirely on sound design and consider playing even less than guitar books. The book titles already make this clear: *Becoming a Synthesizer Wizard: From Presets to Power User* (Cann 2009), *Synthesizer Explained: The Essential Basics of Synthesis You Must Know as a Digital Music Producer* (Cep 2020), *Refining Sound: A Practical Guide to Synthesis and Synthesizers* (Shepherd 2013) and *Creating Sounds from Scratch* (Pejrolo & Metcalfe 2017), amongst others (McGuire & Van Der Rest 2015; Russ 2008). These books have in common the introduction of traditional (subtractive, additive, modulation) and more modern (granular, physical modelling) synthesis methods, sequencing and signal control. Even if explicitly addressing ‘performance’, it is limited to technological aspects such as sound control (for example, Vail 2014). Many of these books cover historical synthesiser instruments in passing; some put greater emphasis on historical developments (for example, Jenkins 2007). Books about synthesiser players are rare, consistent with the relatively low relevance of performance in most literature. A publication from the circles of the *Keyboard* magazine focuses on the *Best of the 80s: The Artists, Instruments, and Techniques of an Era* (Rideout et al. 2008). This book pays tribute to the synthesiser sound of the 1980s that every ‘serious player’ must know. Its blurb reads: ‘how technological developments in keyboards helped artists such as Erasure, Human League, Peter Gabriel, Kraftwerk, Bruce Hornsby, Frank Zappa, and Jam and Lewis create entirely new sounds and how their production tricks can help you make great music today’. This book suggests that copying great sounds from the 1980s with instruments from the past is still the foundation for modern music (see also Reynolds 2012). Unlike books about most other instruments focusing on just one player, very few synthesiser books are dedicated to only a single keyboardist. One of the few is Jordan Rudess’s (2009) *Dream Theater Keyboard Experience: Featuring Jordan Rudess*. It includes two topics: ‘Note-for-note keyboard transcriptions of nine keyboard-intense Dream Theater songs from 1992-2007’ and a ‘conversation with Jordan Rudess’ in which he reveals details of his playing style and ‘special “exercise” pieces to precede each song, each focusing on a challenging playing technique’. In this rare example, playing is emphasised as opposed to synthesis techniques and the respective gear.

Keyboard literature is quite different from that of synthesisers. Most of it focuses on learning the instrument, like for the piano. The books range from songbooks and transcriptions of chart hits to introductions to specific styles, decades, players and bands. Gear plays only an insignificant role, if one at all.

The drum books show a wide variety of topics. Next to general educational books, there are books with varying focuses: drum grooves (Riley 2015; Süer & Alexander 2017), solos (Karas 2014), fills (Toscano 2019), warm-ups (O’Shea 2017) and particular bands that are covered with transcriptions of grooves and play-along CDs (Holliday & Weeks 2007). Several books are dedicated to ‘rudiments’; technical exercises usually practised on a snare drum or a silent practice pad. Such practising differs from all other instruments considered in this study because it is detached from any equipment and tonal considerations. Similarly, books on some genres focus on grooves and tend to ignore gear requirements (Lewitt 2015; Zubraski & Jenner 2001). A few books are dedicated to influential drummers such as Vinnie Colaiuta (Atkinson 2003), John Bonham (Bergamini 2005) or Neil Peart (Wheeler 2000), and they primarily contain transcriptions and some information about their playing technique. Very few books like Nicholls’ (2008) *The Drum Book: A History of the Rock Drum Kit* deal with equipment and development of drum instruments concerning renowned drummers. Books about drum manufacturers and their most famous players are rare (Falzerano 2008). In contrast, a moderate number of books on drum gear and related practices exists. Balmer’s (2018) *Drum Kit Manual* deals with the purchase and maintenance of drums, and Nicholls and Nicholls’ (2004) *Drum Handbook* provides advice on buying, setup and maintenance. Schroedl’s (2003) *Drum Tuning* covers drum setup from the basics of construction and head properties to tuning drums for different genres. Most drum books deal with traditional acoustic kits, but a limited number concentrates on electronic drums (Graham 2019; Ledermann 2015), offering playing advice and stressing the historical significance of electronic drum systems.

We include the saxophone and trumpet as control instruments in our investigation, assuming that gear would not be as psychologically important for these players as for the other musicians under consideration. The special-interest books on the two wind instruments do not indicate a strong focus on equipment. Most books centre on studies, playing technique, scales, fingering charts and drills instead of gear. Neither does gear play a significant role in the numerous songbooks and ‘omnibooks’ for specific genres, players and composers.

Overall, the electric guitar and synthesiser seem to be the two instruments where gear and sound design play the most significant role in musical practice. This finding is consistent with the academic literature on music technology and the journalistic texts on GAS.

3.4 The Musical Instruments Industry

The musical instruments industry cannot be ignored in any discussion of GAS. The already addressed role of technological innovation for the personalisation of sounds

and the growing market for vintage and relic instruments are just two examples illustrating the industry's commercial strategies.

Consumption has always been an inevitable part of music-making, not only on a larger scale such as concerts or media formats but also at the level of instruments required for the performance of popular music genres. For Bennett (1983: 231), the 1950s and 1960s were a crucial period in musical practice. During these decades, popular music was increasingly recorded and sold as a studio-produced commodity. At the same time, live shows became more professional and bigger, and as a result, instruments were amplified by a sound system. Sound quality was improved by a front of house engineer able to process the instruments much more extensively than is possible with just an instrument and amplifier. Both the live show and studio product, created with increasingly sophisticated recording and mixing approaches, changed audiences' expectations of how individual instruments and their collective sound were supposed to be. Comparing the less refined sound produced at home or in a rehearsal room with a professional recording or live show stirred musicians' desires for better quality. Players' rising frustration let the musical instruments' manufacturers recognise economic opportunities with a market to be exploited, so they began extending their range of models to include specialised instruments for various purposes. According to Jones (1992: 92), rock music's economic value brought about equipment that was created just for this genre. As a consequence of popular music genres diversifying, more specialist equipment was gradually designed and advertised for particular genres and subgenres, such as special 'metal axes' from guitar manufacturers like BC Rich. As per Jones (1992: 84), this specialisation strategy though bears economic risks: 'Manufacturers are in some ways caught in a bind, because though designers want to create equipment that is flexible and does not restrict music making, they must also meet the demands of the market'. The high degree of specialisation attracts musicians with a narrow stylistic range or players with large instrument collections inclined to use the optimal gear for specific genres. However, such specialised equipment might prove inflexible and be a reason for musicians to choose a single all-round instrument instead of several niche models.

Focusing on keyboard instruments and digital technologies like samplers, Th  berge (1993: 159ff) argues that the emergence of special-interest print magazines such as *Music Technology*, *Electronic Musician*, *Home & Studio Recording* and *Music, Computers & Software* went hand in hand with the developing musical instruments manufacturing industry for the sake of promotion. The specialised nature of these magazines made it possible to target audiences effectively. The degree of specialisation increased and reached its first peak in the mid-1980s. As we noted earlier, this was also when the first magazines emerged dedicated to vintage instruments. Furthermore, endorsing artists and showcasing instruments in music videos were strategies that came up in the 1980s (Th  berge 1993: 164). This move helped the

wider audience understand who the leading players of the time were and what equipment they were playing. Linked together, this created a strong connection between gear, musical quality and non-musical associations such as lifestyle and success. According to Théberge (1993: 326), it was only a natural consequence that in the 1980s, consumption became a fundamental part of music-making.

musicians have not simply become consumers of new technologies but their entire approach to music-making has been transformed into one where consumption—the exercise of taste and choice—has become implicated in their musical practices at the most fundamental level. (Théberge 1993: 267)

Music-related purchases have become more frequent and plentiful due to the diversification of gear and the shorter lifespan of electronic and digital instruments, which become obsolete more quickly.

In the musical instruments industry, there are many competing interests related to the various attitudes of musicians and players of different instruments. Most devices based on digital technology benefit from advances in technology, making it easy for manufacturers to promote new instrument models because of their improved processing power, larger sound libraries and better connectivity to external devices such as computers (Bennett 2009, 2012). Manufacturers may be motivated by the prospect of being a leader in innovation. Alternatively, they may be tempted to offer just small updates with subtle changes to sell consistently (Frith 1986: 272). Rather than introducing ground-breaking instruments every few years with the prospect of high sales and profits from patents, they would take the more predictable and conservative approach of gradually releasing slightly modified and updated instruments every year. Hence, genuine innovation is not the primary goal for many manufacturers; instead, they prefer to moderately adjust established instruments because minor changes are unlikely to irritate musicians and are still new enough to sell. The introduction of ‘improvements’ bears risks. For example, in 2015, guitar manufacturer Gibson updated the manual tuning system in favour of the G-Force. With this automated tuning system, strings are prevented from going out of tune during a performance, eliminating the need to break in new strings and making it easier to switch between tunings. Despite these apparent advantages, most of the tradition-conscious Gibson community did not accept this ‘upgrade’, prompting the manufacturer to return to traditional tuners (Corfield n.d.).

In the formative years of rock music, instrument technology has developed rapidly through close cooperation between renowned musicians and manufacturers. Taking the guitar as an example (see also Herbst 2016), the British company VOX released the AC15 in 1958, the first amplifier specifically designed for the electric guitar. Shadows’ guitarist Hank Marvin requested VOX to increase the output from 15 to 30 watts the following year. In 1962, the Marshall JTM45, a modification of the American Fender Bassman, was invented by the British developer Jim Marshall

in collaboration with The Who's Pete Townshend. Soon after, the equalisation section was extended to include controls for treble, middle and bass frequencies as well as presence and resonance shaping, allowing players to customise their sounds. In the 1970s, guitar amplifier innovators such as Jim Marshall and Randall Smith added a pre-amplifier stage that allowed players to switch between clean and overdriven sounds at selectable volumes. The 1980s saw a development of nuanced control through sophisticated rack designs requested by famous shred guitarists. During the 1990s, hybrid and transistor technology became more widely accepted due to the popularity of nu metal, but since then, hardly any aesthetically novel technologies have gained acceptance. Profiling and simulation amplifiers are becoming increasingly popular because they come closer to a valve amplifier's sound than ever before. Producer and engineer Alex Silva at Hansa Studio notes, 'I think companies like Kemper are on the cutting edge of being able to provide musicians with the quality that they need without feeling that they're kind of losing connection to the past of guitar playing ... I don't think one thing suddenly replaces the other' (Herbst 2021). However, digital guitar technology does not intend to establish a new aesthetic; its acceptance in the community relies on delivering a variety of analogue valve tones at the touch of a button (Herbst 2019a). The development described for the guitar is similar for bass and drums, with most players appreciating old equipment, technologies and sounds. From an economic perspective, this stagnation causes problems, as Will Straw (2000: 156) points out:

The market for individual cultural commodities is perpetually marked by the probability of saturation of a pool of potential consumers. Sales of an individual title may neither follow an irreversible upward movement nor stabilize at a permanent level; rather, any growth in the sales of a cultural commodity will bring it closer to the point at which its sales potential is likely to be exhausted. As a result of these conditions, the fate of a cultural commodity is more likely than that of other commodities to be imagined in temporal terms, as a life cycle. This lifecycle will unfold in a series of stages between the moment of its release and the point at which the probable upper limit on its sales has been reached.

Straw (2000: 156f) goes on to argue that the use-value is hardly relevant in this respect, stating that a 'record or book bought once need not be bought again, however stable and solid the use-value which it provides'. The general principle applies to musical instruments as cultural commodities, but we do not see the same pattern. It is not uncommon for musicians to own the same instrument model more than once. On the one hand, live gigs and touring may require the acquisition of more than one instrument of the same type. Most musicians will feel more comfortable having backup gear to limit the impact of broken strings or valves during a live performance.

On the other hand, unlike a book or record⁸, musical instruments are rarely entirely identical; even the same model built in the same year and factory may sound slightly different due to production irregularities and natural variations in the organic parts. Furthermore, the colours could differ, either deliberately by design or by coincidence. This higher degree of variation distinguishes musical instruments from many other cultural commodities. It allows the industry to reap multiple benefits from selling the same product and allures GAS-affected musicians to purchase additional gear. This business strategy is noteworthy, given the many players who prefer traditional instrument models over modern interpretations. Notions of ‘progress and change’, as Théberge (1993: 166) claims, seem to be relatively unimportant for most players of popular music, apart from specialist groups such as future-minded keyboard players. For most others, the musical instruments industry needs to provide more convincing reasons to invest frequently in gear that is not substantially different from that already owned.

3.5 Gender

Any discussion of music technology and GAS must consider gender. Previous studies on music technology in general (Comber et al. 1993), music production (Hepworth-Sawyer 2020), hi-fi audio (Jansson 2010; Schröter & Volmar 2016), the musical instruments industry (PRS Foundation 2017) and gear collection (Wright 2006) have provided ample evidence of gender inequality and discrimination. Wright’s (2006) claim that GAS is an all-male phenomenon either reflects common discriminatory practices or merely a superficial statement. The little research available strongly supports the first option: discrimination. The ratio of female participants in quantitative studies on music gear has rarely reached over 5% (Herbst 2017a), and qualitative studies on guitar players often do not include a single female musician (Fernandez & Lastovicka 2011) let alone players of non-binary gender. In the following, we understand gender as a ‘system of social practices within society that constitutes distinct, differentiated sex categories, sorts people into these categories, and organizes relations between people on the basis of the differences defined by their sex category’ (Ridgeway 2011: 9). In music technology and musical practices, this distinction is usually binary between male and female, but it is commonly implicit, as female presence is often not existent.

In music education and psychology, a large body of research has confirmed that instrument choice is gender-specific from early childhood. In Western cultures, instruments are traditionally divided between female—harp, flute, piccolo, clarinet, oboe, violin and voice—and male—electric guitar, bass guitar, tuba, drum kit, table

⁸ Music albums differ from books in that collectors or fans of a band can purchase the same music in different formats, and special editions can justify buying the same album more than once (Shuker 2010: 57ff).

and trombone (Clawson 1999a; Hallam et al. 2008: 7; Sheldon & Price 2005; Wych 2012). Some instruments are considered more neutral, such as African drums, cornet, French horn, saxophone and tenor horn (Hallam et al. 2008: 7). The reasons for this gendered distinction range from the physical shape and attractiveness of instruments to their pitch range, sound quality and specific playing requirements like physical endurance (Hallam et al. 2008: 7ff). Social factors such as parents' instrument preferences also play a role (Delzell & Leppla 1992; Griswold & Chrobak 1981). Some research has found primary schools to have the most significant impact, and consequently, children and adolescents would tend to adhere to such learned and stereotypical instrument choices throughout secondary school (Zervoudakes & Tanur 1994). However, other research has suggested that young female musicians in later phases of their education increasingly decide to learn more male-associated instruments such as the drum kit and the electric guitar (Hallam et al. 2008: 15). Overcoming traditional stereotypes thus seems possible with developing identity through maturation, role models, emancipation from parental influences and changing musical preferences.

Studies of the rock music scene suggest that the 'social prestige' of an instrument determines who is to play it. According to Berkers and Schaap (2018: 69), status and prestige are determined by the two factors of being a member of a band and having a particular role in it. In addition to 'social barriers' (Bennett 2017: 26) to joining a band arising from the tendency towards homosocial solidarities and the potentially disturbing 'threat' of sexual tension (Clawson 1999a), Berkers and Schaap (2018: 70f) cite two other reasons that often determine the role of female musicians in a band. According to the 'queuing theory' (Reskin & Roos 1990), women can gain access to a field if they take on roles that men have begun to abandon. Similarly, the 'empty-field theory' (Tuchman & Fortin 1984) suggests that women are more likely to take on roles with lower skill requirements and hence less prestige. In the rock context, the bass has traditionally been the instrument that made an otherwise purely male band most accessible to women (Carson et al. 2004: 4; Gay 1998: 88ff) because, despite its fundamental musical role, the bassist is receiving less attention on stage and is less audible on the record. For the same reason are keyboard, string and wind instruments regarded as 'feminine' in a rock context (Gay 1998; Berkers & Schaap 2018). However, depending on the reputation these instruments enjoy in other genres, the opposite could be the case. Many gender-specific rules involved in a band context go far beyond musical reasons (Berkers & Schaap 2018: 52ff). The supporting role, as opposed to the leading, is what allows female instrumentalists to join a band. In contrast, it is no problem when women are in the spotlight as singers (Clawson 1999b; Gay 1998). Although research would allow the conclusion that women have been suppressed and reduced to an unattractive role or accepted as a 'band ornament' (Gay 1998: 88) or 'token' (Berkers & Schaap 2018: 82ff), Gay (1998: 90) suggests that female bass players have found ways to create

‘new configurations of meanings and relationships’ and to ‘exploit, adapt, and transform the technology and its cultural meaning’, thereby undermining discriminatory practices from within the scene and social context of a band.

Another common explanation for gender differences in instruments, especially when it comes to genres like rock music or electronic dance music (EDM), regards technology. As the argument goes, boys are interested in technology, and this general interest extends to music. Boys are said to show interest in music that relies substantially on technology (Comber et al. 1993: 123; Hallam et al. 2017: 117). As a result, they enjoy playing electronic and digital instruments such as the electric guitar and bass, electronic drum kits and turntables. They further have an affinity with other computer-based music practices, thus constituting technical competence and respective musical activities as ‘an integral part of masculine gender identity’ (Gavanas & Reitsamer 2013: 56). In a recent meta-study of the metal genre (Berkers & Schaap 2018), women were found to mainly take on the roles of singer, keyboard player or acoustic guitarist but less that of the electric guitarist. As a key reason, Bayton (1997, 1998), who studied gender differences in rock music, identifies *technophobia* amongst women. An interviewed female electric guitar player expressed her opinion on this matter:

I think there is a tendency for us still to be scared of equipment: the ‘black-box-with-chrome-knobs’ syndrome ... I’ve obviously become very familiar with what I do but I still don’t feel physically as at one with my equipment as I think most men do... It took me a year before I turned my volume up. Roger would see that my amp was turned up even if I turned it down, because I was still scared of it... of making a noise to that extent. I turned the knobs down on my guitar for a whole year. (Bayton 1997: 42)

The standard male behaviour was the opposite, as another female musician indicated in the same study:

Men like twiddling about with their knobs and fiddling about with their electronics and what their equipment can do, and how many pedals they’ve got, and how many flashing lights they’ve got on it. Like they’ve got six strings on their bass instead of four. And what colour it is and what make it is. Whereas women just go, ‘Oh, I’ve got an old drumkit, that’ll do.’ Women aren’t specifically precious about their equipment, even though they’ll try and get the best they can afford and get hold of. They won’t be faffing about with knobs and spending three hours tuning up when you’ve only got three hours to practice in and you’re trying to write a half-hour set or something ... I think a lot of it is men trying to prove to each other that they’ve got bigger and better equipment. (Bayton 1998: 82)

Bayton (1998: 82) concludes that the interviewed female musicians commonly believe that women are less competitive in terms of equipment and instead focus on musical goals rather than on details of gear and tone. However, Bayton’s findings may not be valid any longer since the interviews took place more than twenty years

ago. With educational campaigns and a higher number of female role models, it could be assumed that today fewer women are affected by technophobia. However, recent research does not fully support this deliberation. Examining music technology education in Britain, Born and Devine (2015) find that although 55% of the general student body is female, the students enrolled in music technology courses are predominantly male (90%). As the authors demonstrate, this gender imbalance increases at higher education levels. Between the age of 6 and 16, almost half of the students choosing music technology as their primary instrument are female (Born & Devine 2015: 147). In the group over 16, the proportion of female music technologists drops to a quarter, followed by a drop to 18% for music technology A-levels, and finally to a low 10% for enrolment in university music technology courses. One of the possible reasons for the decline in female participation in higher music technology education regards historically derived notions of gender and technology. Referring to Blickenstaff (2005: 370), Born and Devine (2015: 147) note that ‘women still display “lowered interest, negative attitudes, lowered performance, and ... anxiety” when it comes to computers and digital technology’. The same might be the case for musical instruments that rely on amplifiers and other electronic sound control devices, which would be consistent with Bayton’s findings. This caution concerning music technology, Born and Devine (2015: 147ff) reason, stems in part from practices in music education that reinforce the distinction between boys and girls in terms of confidence in the use of technology (Citron 1993; Green 1997; Solie 1995) and the traditional gender-specific choice of instruments. They argue that

Instruments can ... serve as key avenues through which larger musical formations such as genres are constructed as gendered communities of practice. In this sense, digitization in music education extends a tradition in which men have dominated electronic and electroacoustic composition and instrumental performance both in the classical avantgarde and in technologically oriented popular genres such as rock, hip hop, and various dance musics. (Born & Devine 2015: 149)

Born and Devine’s meta-study suggests that female musicians still feel less confident than their male counterparts in using music technology, a disadvantage that is particularly noticeable in popular music genres.

Traditionally, the music industry has classified its customers by gender; women were perceived as passive fans and consumers, men as central actors and producers (Maalsen & McLean 2018). The readership of music magazines makes this divide clear. In the 1990s, the proportion of subscribers to *Vintage Guitars* was 99% male and 95% for *Acoustic Guitar* (Ryan & Peterson 2001: 105f). The *Keyboard* readership was 98% male (Théberge 1997: 122).⁹ However, there are indications of this unequal distribution to be changing, as there is a rise in the proportion of female

⁹ For comparison, Shuker (2010: 34) reports that small numbers between 5 and 18 per cent of readers of vinyl magazines are female.

musicians on formerly male-dominated instruments. In 2018, the renowned guitar and bass manufacturer Fender made headlines when it published a study showing that 50% of new guitar players were women (Duffy 2018). While many female guitarists stated moderate ambitions to play privately rather than contemplating becoming famous, 72% were motivated to gain a life skill and 42% considered the guitar part of their identity. However, the study's scientific quality, which the instrument manufacturer claims to have carried out with a brand strategy and innovation consultancy, must be questioned. We could not find a detailed description of the survey beyond a detailed press release (Fender Musical Instruments Corporation 2018), which is peppered with numerous references to Fender's own education platform Fender Play. Moreover, the postulated claim to representativeness appears doubtful against the study's methodological background, which is briefly outlined in the press release. While this study is primarily to be understood as an expression of the manufacturer's strategy to focus more on female musicians and thus expand its customer base, there are more tangible signs of change, for example, in guitar player magazines. A blog article on *Guitar Player's* web presence (Molenda 2017) acknowledges that the community has been a 'boys club' since the magazine was founded in 1967 but stresses that male dominance has declined. There is a growing awareness of inappropriate sexist gear advertisement, which discredits women by depicting them in sexual positions, fetishizing women rather than expressing appreciation for their musical skills (Farrugia & Olszanowski 2017: 3, Théberge 1997: 123f). Although matters are improving, sexism is still not stopped altogether in guitarist Fabi Reyna's perception: 'It's always a woman holding a guitar half-naked or overtly sexualized, and it isn't matched with an article talking about her talent, or that she's a musician' (Berlatsky 2015).¹⁰ For this reason, Reyna founded the guitar magazine *She Shreds*,

the world's only print publication dedicated to women guitarists and bassists. We strive to change the way women guitarists and bassists are depicted and presented in the music industry and popular culture by creating a platform where people can listen, see and experience what it means to be a woman who shreds.¹¹

This emancipation and the strong personal interest in guitar playing and technology are further confirmed by a Brainyard analysis of guitar search profiles, which shows that women made 49% of the web searches on guitar-related topics in 2017. Molenda (2017) on the *Guitar Player* blog concludes:

These are rather earthshaking statistics, as they point out that women are, for the most part, equally active in seeking guitar data as are men. If the trend continues, the industry may need to adjust its perception of men as the movers and shakers and gear drivers, and look to women players as a viable and equivalent market for

¹⁰ Another related phenomenon is the 'booth babes' at musical conventions like the NAMM, which have become less common in the last years (Gallier 2018).

¹¹ <https://sheshredsmag.com/about/>; accessed 16 September 2019.

guitar products, guitar information, guitar marketing, and, well, pretty much all things guitar.

At present, however, we do not seem to be quite there yet, at least when considering the research from the last ten to twenty years. Berkers and Schaap (2018) confirm the widespread practice in music stores of regarding women as (girl)friends or family members of male musicians instead of recognising them as musicians in their own right (see also Carson et al. 2004: 18; Sargent 2009). A female interviewee describes the experience when buying her first drum kit: ‘it’s all guys there and they were surprised that I wanted to buy a drum set and that I wanted to buy drum things’ (Berkers & Schaap 2018: 67f). Bayton (1998: 31) lists several similar experiences by female guitarists:

Louise Hartley: I always think they’re gonna laugh at me for some reason. I hate them... There’s a massive guitar shop in Birmingham called Music Exchange and the guys who work in there just love themselves. They strut around. And if you walk in and try and buy something, they’ll ignore you and you have to beg for your help ... There’s no women work there, either. It’s all male guitarists with long hair and tight trousers.

Aimee Stevens: I feel very intimidated. Especially going to ask—they’re all stood behind the counter, these massive metal blokes. Well, that’s what they look like, judging by their image. I go up and go, ‘Can I have a top E string?’ because I don’t know the proper names or anything, so it’s even worse. And they go, ‘What gauge? What sort?’ And I’m like, ‘I don’t know’. So I don’t like going in and looking at guitars or anything in music shops ... When you’re trying they’re just staring at you. If you don’t know much as well—and then they pick it up and go (imitates complicated guitar playing) and you’re going, ‘Oh no, I’ll just take that.’

Fran: You go in and all the blokes are sitting in one corner talking about some riff that they came up last night, totally ignoring you. They are very patronizing. They see that you’re a woman and they think, ‘How you dare come in our music shop?’

These quotes demonstrate the uninviting atmosphere for women in music stores, where they are often treated with disrespect (see also Beaster-Jones 2016: 88f; Carson et al. 2004: 17ff; Gallier 2018). According to Sargent (2009: 665), the culture of music stores is ‘driven by masculinist fantasies of the rock musician lifestyle’. Statements like ‘all male guitarists with long hair and tight trousers’ and ‘massive metal blokes’ confirm this theory. Besides the masculine rock star attitude, the relationship to technology plays a considerable role (Carson et al. 2004: 17ff). Habitus and knowledge of technical details serve as expressions of capital and power (Bourdieu 1991; Fiske 1992; Foucault 1990), allowing male employees and customers to defend their hierarchy and status within the store and the wider music community. Apart from the ‘nerdy’ verbal discourse, status is determined by practical skills in playing and using technology. Bayton (1997: 41) observes:

boys tend to feel at home there [guitar stores]. In any of these shops you can observe the assertive way in which young men try out the equipment, playing the beginning of a few well-known songs time and again, loudly and confidently, and even through those few bars may encompass the sum total of their musical knowledge. In contrast, nearly every one of my interviewees said that guitar shops felt like alien territory ... trying out the equipment was akin to being on trial.

The competitive character of guitar and musicians' stores contributes to the unwelcoming atmosphere for women, coding it as a male space and thus forming a social barrier (Bennett 2017: 26; Gavanas & Reitsamer 2013: 57) that may exclude especially young female musicians from contact with musical gear.

Gradually, stores are adapting to the higher number of female musicians playing instruments that were formerly seen as male-dominated. Increased employment of female store assistants and technicians is a strategy to create a more welcoming, non-sexist atmosphere for female customers (McMahon 2015; Sargent 2009: 666). Improving matters includes acknowledging different attitudes between the genders. General manager of Detroit Guitar, Charlie Lorenzi, explains:

You have a guy coming in, and he has it in mind that he likes Martin guitars—he may never have played one before—and it's very unlikely you're going to talk him out of that. Women will take in information, keep an open mind and make a more-informed decision based on what's good for them, rather than what's trendy or what their grandparents bought. (Lorenzi as cited in McMahon 2015)

Other managers stress the importance of non-patronising, gender-neutral consultation to ensure that all customers are treated with the same high level of respect, with women being recognised as musicians and not exoticised as 'female musicians'.

Leaving aside the pressure from online music retailers, which forces music stores to improve their service, the attempt to be more inclusive could well be explained by the queuing theory (Reskin & Roos 1990) because rock music's relevance for popular music culture has declined continuously in recent years. Prestigious roles have shifted, leaving space for women to slowly enter the formerly male-dominated positions such as the drums or lead guitar. But also in other currently commercially more successful musical scenes, such as electronic dance music cultures and DJing with their strong focus on 'competence in the latest music production equipment and software' (Gavanas & Reitsamer 2013: 55), power structures are increasingly questioned, as recent publications demonstrate (for example, Farrugia 2012; Farrugia & Olszanowski 2017; Gavanas & Reitsamer 2013; Hancock 2017; Reitsamer 2012).

Farrugia (2012: 30) describes how record shops as the places of collecting and acquiring records supported power structures in the Foucauldian sense for a long time, thus supporting a gatekeeping process that excluded women from DJing:

The organization of EDM in speciality record shops by subgenres and labels was more likely to mystify naïve consumers than to offer an inviting learning space,

especially for women. As EDM grew in popularity in the 1990s, these male-dominated spaces became central hubs where knowledge was shared and social networks developed between collectors, producers and DJs.

Male dominance in the scene may not have changed altogether, but over time, networks of female musicians have increasingly emerged, intending to break down these entry barriers. From a rare intersectional perspective, Hancock (2017: 74) uses the example of the lesbian Lick Club in Vancouver and its role in the regional electronic dance music scene to show that physical women-identified spaces can provide female, trans and non-binary musicians with access to mentors, female role models, equipment and performance opportunities and thus with access to former 'boys' club(s)': 'Being part of a localized network gives female DJs the opportunity to receive support from colleagues in invaluable ways, such as getting advice on skills and technology, and opportunities to play for an audience' (Hancock 2017: 80). Given the homosociality of male DJ networks (Farrugia 2012; Gavanas & Reitsamer 2013), these likely are safe spaces where women and non-binary musicians can gain experience in a supportive environment.

Unsurprisingly, similar approaches are also expanding into the digital realm. With a focus on the EDM scene, Reitsamer (2012) describes the translocal virtual network Female Pressure, founded in 1998, in which female DJs, music producers and club managers of all ages and different origins exchange and organise themselves in mailing lists and social media platforms. While a central concern of the network is the pursuit of a feminist agenda in the sense of third-wave feminism, it also enables the exchange of experiences on the practical aspects of DJing and thus represents a valuable resource for the acquisition of expertise as well as discussion of music technology by female DJs: 'Being part of a localized network gives female DJs the opportunity to receive support from colleagues in invaluable ways, such as getting advice on skills and technology, and opportunities to play for an audience' (Reitsamer 2012: 80). Networks such as Female Pressure, Pink Noises, Shejay or Rubina DJanes (Gavanas & Reitsamer 2013: 60) thus offer spaces for musicians who do not want to subordinate themselves to male hegemony. Nevertheless, they are not without controversy either. On the one hand, these networks are seen as a further means to democratise access to music technology and electronic dance culture. On the other hand, they find themselves 'confronted with the problem of possibly reinforcing hierarchical gender differences and as a result, the binary structure of male/female social network segregation, as well as self-presentation in terms of masculinity and femininity, is not altered' (Gavanas & Reitsamer 2013: 71).

Even if one leaves male spaces such as music shops aside, sexism plays a role in the structures of the musical instruments industry that should not be underestimated. A vivid example is the gear industry's failed marketing strategy of addressing its regular clientele by relying on sexist product names and graphics such as Steel

Panther's signature guitar pedal 'Pussy Melter' by TC Electronics, advertised as follows:

Wanna make a physical impact on your audiences, with an epic delay tone? Then Satchel's got you covered! When we met up with Steel Panther's oh-so-humble guitarist, he had only one condition: that the tone be as wet as the ladies on the front row! With 'Pussy Melter' that's exactly what you get: a delay tone, which perfectly nails that heavy metal lead tone, while simultaneously ensuring that the janitor ain't going home early! So if glam rock guitar solos and wet floor signs are your idea of a good time, then 'Pussy Melter' for Flashback Delay is definitely the TonePrint for you! (Standell-Preston 2018)

The product was eventually removed on pressure from online petitions, but this recent example from 2018 highlights that the problem of sexism in connection with musical gear still exists.

A first sign that the musical instruments industry is opening up to female musicians is the recent increase in the number of instruments designed to adapt to their bodies. Nevertheless, until 2017, women-specific instruments were not produced and marketed to the extent that the media would have reacted to them. Pondering about the reasons, Cate Le Bon (2017), in a *Guardian* blog, speculates: 'I wonder why it has it taken so long for the anatomy of a woman to be considered when designing a guitar? Maybe it is the fear that it would immediately adopt the stigma of an inferior instrument, while suggesting its player's gender is a handicap'.¹²

Annie Clark of the American pop band St Vincent is considered to have designed the first electric guitar for women. She collaborated with manufacturer Ernie Ball and created her signature guitar, 'Music Man St Vincent' (released in 2017). It is based on Gibson's Explorer model but modified to avoid the curved shape of most conventional guitar models. On Twitter, she explains: 'I wanted to design a tool that would be ergonomic, lightweight, and sleek. There is room for a breast. Or two' (Scippa n.d.). With its smaller shape and lighter weight of about three kilograms, it is designed to be more comfortable for women and anyone of smaller stature to play. The extravagant design and unique specifications further underline the difference to traditional guitars and symbolically point to a modernist, future-looking mentality and the rejection of male-dominated vintage instruments. Another guitar for female players is the 'Glitterbomb' model, which has been manufactured since 2017 by Vance Guitars in collaboration with Glitoris guitarist Samantha Bennett. As the official website states, '[t]he principal requirement was to provide a lightweight guitar

¹² Originally, the guitar was a mainly female instrument, but as its popularity in jazz, country and big band music grew, men quickly adopted it. Changes in the guitar's physical shape, especially its increased size, are said to have made it more difficult for women to play it (Carson et al. 2004: 11).

designed for women players that wrapped around the body, didn't dig in and was a comfortable and slick player'.¹³ Bennett explains the idea of the guitar as follows:

One thing that's always pissed me off about guitars is how they are 100% designed for men. I practice and rehearse sitting down and there's this dimension—the point between your thigh/torso and chest where the guitar sits. My Bullet and Jaguar always crushes my right tit, so we worked on a more scooped out cutaway and a smoother, more angled cut out at the back of the guitar.¹⁴

Dimension may also be considered an issue by female musicians when it comes to the neck scale of bass guitars (Emiliani 2015; Wolfle 2013). As a reaction, manufacturers like Luna Guitars offer bass guitars with shorter necks for smaller musicians or musicians with small hands. The development of these instruments goes hand in hand with women entering the industry and the slow diversification of the manufacturer's recruitment policy (Gallier 2018). However, these observations seem to be limited to the guitar and bass. To our knowledge, there are no special designs optimised for the comfort of female drummers and keyboard players.

Another sign of change is the market for signature instruments that has long been dominated by male performers. In 1988, Bangles' Susanna Hoffs received a Rickenbacker signature guitar. Bonnie Raitt—winner of eleven Grammy awards and sixteen nominations—was the first female guitarist to obtain a signature model from the renowned manufacturer Fender in 1996 (Scapelitti 2016). Another woman honoured was Jennifer Batten, guitarist for Michael Jackson, receiving a Washburn signature guitar in 1998. But it took until the late 2010s that female guitar and bass players received signature models on a larger scale: Joan Jett's Gibson Melody Maker in 2010, Orianthi's PRS SE Orianthi in 2011, Sheryl Crow's and Avril Lavigne's Fender Stratocaster, Grace Potter's Gibson Flying V as well as Lita Ford's BC Rich Warlock in 2012, Lzzy Hale's Gibson Explorer and Nancy Wilson's Gibson Nighthawk in 2013, Eva Gardner's Fender signature bass in 2014. However, it is worth mentioning that several of these signatures are part of renowned manufacturers' budget series—for example, Squire endorsed by Fender—or of less reputable manufacturers. Nita Strauss, live guitarist for the Alice Cooper band, was the first woman to finally receive a signature model in 2018 from the popular manufacturer Ibanez.¹⁵ She is one of only twenty-five selected musicians listed on the official website for the European market.¹⁶ The increasing number of female musicians receiving signature models is a positive step forward, as they serve as influential role models

¹³ <http://vancecustomguitars.com/product/glitterbomb>; accessed 16 July 2019.

¹⁴ <http://www.kitmonsters.com/blog/glitoris-making-the-glitterbomb-guitar>; accessed 16 July 2019.

¹⁵ <https://www.ibanez.com/usa/artists/detail/568.html>; accessed 16 July 2019.

¹⁶ https://www.ibanez.com/eu/products/category/electric_guitars; accessed 16 July 2019.

for young musicians. Nonetheless, only the most distinguished female musicians receive signature instruments in the same league as their male counterparts to this day. Many successful women players are still treated as second-class musicians, which reflects in endorsements. Manufacturers of drum accessories, for example, are willing to endorse female drummers with inexpensive signature drumsticks but hardly with full instruments. Of the 267 endorsed artists listed on the website of the drum kit manufacturer Mapex, only five (2%) are read as female.¹⁷ Of the 184 Pearl artists in Europe, seven (4%) are female¹⁸, and of those endorsed by Yamaha Europe, only one in 69 (1%) is a woman¹⁹. Apart from the meagre percentage of female drummers across all manufacturers, it is noteworthy that for those listed, mainly endorsements are offered but no signature models.²⁰ The small percentage of women is not limited to drums. Only one in 55 (2%) of guitar and bass players endorsed by Yamaha Europe is female. The percentage amongst keyboard and synthesiser players endorsed by Yamaha Europe (2 out of 24; 8%), even if better, still is far from equal. Five of 153 (3%) players endorsed by Marshall amplifiers are women²¹. Bass manufacturer Warwick holds the negative record, with the eleven signature artists all being men, and only nine of 224 (4%) endorsers are women²². Like Yamaha, the popular Nord brand has a relatively high percentage of female keyboard players (32 of 350; 9%)²³. However, although women often perform the role of keyboardists in bands, the relative proportion of endorsements below 10% and the absence of signature models show a drastic underrepresentation of female musicians among the honoured professionals, which indicates lacking recognition from the industry.

Wright (2006: 26) concludes his book on the Guitar Acquisition Syndrome with his impression that ‘about 99+% of all GAS sufferers are male. It seems as though GAS is about as unlikely to strike a female as the art and craft of scrapbooking is to strike males’. The previous discussion has demonstrated the uninviting practice in physical spaces such as music stores, where historically, female musicians were seen as appendices to family and partners, rarely recognised as musicians. There are hints of change, but decade-long habits die slowly. Due to inappropriate behaviour,

¹⁷ <http://mapexdrums.com/international/artists.aspx>; accessed 16 July 2019.

¹⁸ <http://www.pearleurope.com/artists/all-artists>; accessed 16 July 2019.

¹⁹ <https://europe.yamaha.com/en/artists>; accessed 16 July 2019.

²⁰ Endorsements usually mean that artists receive an instrument or piece of gear for free from the manufacturer with various conditions attached, such as the requirement to play only the sponsored equipment on stage. A signature deal is much more exclusive. It commonly involves the customisation of stock models or the creation of a unique model with the name of the associated performer. The honoured artist may receive a share of the profits made by the manufacturer.

²¹ <https://marshall.com/marshall-amps/endorsers>; accessed 16 July 2019.

²² <http://www.warwickbass.com/en/Warwick---Artists--Artist.html>; accessed 16 July 2019.

²³ <https://www.nordkeyboards.com/artists>; accessed 16 July 2019.

women likely feel insecure in such spaces and may refrain from openly showing their interest in musical equipment. With all its options for anonymity, the Internet seems more inviting, as the Brainyard analysis of web search data has shown (Molenda 2017). However, the increase of female musicians playing instruments such as the electric guitar, bass and drums is neither reflected in qualitative interview studies (Fernandez & Lastovicka 2011) nor anonymous quantitative studies advertised on message boards (Herbst 2017a). The lack of presence leaves room for speculation about whether many female musicians have low confidence in their (technological) abilities or whether they do not trust the respective research.