

Meditative Live Coding and Musicological Hindrances

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ABSTRACT

In certain situations, music live coding obtains a meditative quality. Meditative live coding can offer benefits beyond the sounds produced, but not in all performances. This paper explores live coding as a method to cultivate mindfulness. It argues that three conventional ideas about musical practice exert a strong regulative force in live coding performance: the notion of the “musical work,” the idea of music as a “thing,” and the conviction that music requires interpretation. Drawing on the work of music scholars such as Lydia Goehr, Carolyn Abbate, and Christopher Small, and deploying a pragmatic approach influenced by William James, this study offers an historically-informed theory of live coding that highlights its usefulness in cultivating an awareness of the present moment.

1 Causing Problems with Live Coding

It makes for a good one-liner to say that “live coders are much more interested in causing problems than solving them” (McLean 2017). More than just humorous, this statement differentiates live coding from other kinds of coding, especially the unit tested and peer reviewed kind. As the number of people who are paid to write code continues to grow, even in free software communities that were once comprised entirely of hobbyists (Buytaert and Tift 2016), we imagine live coding as an oasis detached from the stress of fulfilling software acceptance criteria. Therefore to say that live coding “causes problems” is also to remind that live coding offers a more pleasurable alternative to writing code for money.

In fact, live coding offers a wide variety of benefits. Rather than cause problems, live coding can ameliorate them. Employing algorithms, visuals, a nearly limitless supply of sounds, pitches, timbres, tempos, etc., live coding creates opportunities unavailable to other artistic practices. Participants view live coding as an activity that does the opposite of causing harm – it entertains, edifies, and educates. The live coding event can be a place of contemplation, a sonic escape from the stress of everyday life.

Others have already noted that live coding can have a strong “meditative ethos” (McLean 2014; Hall 2007). Certain varieties of live coding are described as “meditative sonic studies” (Collins et al. 2003, 323) and in some cases live coders actually perform on meditation cushions (Smallwood et al. 2008, 10). Whether we are dancing at an algorave, sitting in a concert hall, or learning in a classroom, all varieties of live coding can be meditative. We decide how and when to enter the flow of the present moment.

Unfortunately, external factors can negatively affect our capacity to experience live coding as meditation. Everyday things, such as a cold room, a barking dog, or the number of likes a live coding video receives affect our experience. In our so-called “attention economy” where “attention merchants” compete for our attention and treat it as a commodity (see Wu 2016), marketers can commercialize a live coding event, making our experience feel less like an escape. Even otherwise beneficial activities – such as using live coding as art activism, music education, music therapy, a tool to teach kids to code, or as a kind of *Gebrauchsmusik* (“useful” music) intended to enlighten other people – can alter the “meditative ethos.”

Perhaps the most powerful hindrances come from within. With music live coding, like any musical practice, we sometimes experience a nagging feeling that the sounds we produce must meet or exceed a vague concept of “good,” even when we practice live coding in private. We might view a practice as too mechanical, unimaginative, or somehow not “authentic.” But while society may impose numerous restrictions – unwritten rules – on some composers, performers, listeners, producers, and others involved in the production of other categories of music, we typically understand live coding as exempt from these restrictions. If we ever got to the point where live coders were over-analyzing their experiences and required a copy of *The Inner Game of Music* to deal with anxiety (Green and Gallwey 1986), some might say that we’ve gone far away from our idealized, improvisatory and unencumbered experience of live coding.

Focusing on music live coding, this paper investigates culturally-conditioned internal barriers that rob us from enjoying the practice of live coding as a meditative, salutary experience. Specifically, this study examines the regulative function of

three long-standing and pervasive ideas that influence our live coding experiences: the notion of the “musical work,” the idea of music as a “thing,” and the conviction that music requires interpretation. This paper argues that we must abandon these three ideas during a live coding performance to maximize its meditative potential. The live coding considered here does not generate “musical works.” Unlike the live coding described on toplap.org, for example, that “generates improvised music,” a meditative live coding does not generate any *thing* that requires analysis. We will see that when we abandon ideas about works and music, we have less to overcome or improve, and that the live coding event can be more readily experienced as a flow from one moment to the next.

But before digging into ideas about works, music, and interpretation, the word “meditative” requires some additional comments. In this paper “meditative” refers specifically to something akin to *vipassanā* (insight) meditation, or “a direct and gradual cultivation of mindfulness or awareness” (Gunaratana 2011, 25). This meditative ethos focuses the attention on the present moment not only for individual growth and development, but also to improve connections to the world. Using this framework, we can determine if a particular concept or activity keeps our mind in a state of awareness or if it causes us to think instead about the past, future, another location, or anywhere else outside of the present moment. For our purposes, “meditative” has nothing to do with entering into a trance, getting high, escaping reality, self help, overcoming mental illness, finding religion, or understanding how algorithms or live coding “extend” the mind (Dahlstedt 2018). Nor is this a treatise on beauty, enjoyment, or a pure, aesthetic experience. “Meditative,” in this paper, is akin to mindfulness and the cultivation of present moment awareness.

Because an awareness of the present moment is always available to everyone, this study makes little effort to differentiate between activities such as performing, listening, or dancing. Indeed, most of the claims offered here apply to each of those activities. While obvious differences between these kinds of activities exist – the performer at a live coding event requires a knowledge distinct from that required of the listener, for instance – this paper conceives of live coding as an activity comparable to other meditative practices that foreground our connections to the world and abandon ideas that separate us. To borrow two words from Noam Chomsky, this paper focuses more on issues related to the *performance* of, rather than *competence* in, live coding (1965). The social practice of live coding provides an opportunity for anyone physically present at a performance to connect with the other participants and pay attention together.

Finally, this paper conceives of a meditative live coding experience as *practical* and adopts an approach, inspired by the work of William James, that emphasizes “practical consequences” (1907, 45). This approach views meditative live coding as an activity with the potential to bring about positive changes, and it draws from decades of neuroscience research into the permanent, positive results that specific meditative activities cause, or what some of the leading meditation researchers call “altered traits.” Put another way, “It’s not the highs along the way that matter. It’s who you become” (Goleman and Davidson 2017, 45). Pragmatists turn towards experience and facts, and in this instance the facts suggest that a wide array of meditative experiences benefit our brains. In this paper we will investigate how ideas about musical works, music, and analysis pull us away from the moment and limit the potential of live coding to positively affect our brains.

2 Live Coding without Musical Works

Few ideas have wielded more regulative force in the history of musicological discourse than that of “the musical work.” In some instances, we equate a musical work with a score, while in others it is found in a performance or a recording. Our Western culture regularly conflates the idea of the musical work with music and views the work as fundamental to most musical activities, with improvisation a notable exception.

Abundant evidence reveals the extent to which the work informs our 21st-century experiences of live coding, and literature about live coding is littered with references to the musical work. For instance, one study examines live coding as a “generative process” for “creating new works” (Brown and Sorensen 2009, 28), another “considers live coding as a new evolutionary branch of the musical score” (Magnusson 2011, 19), and yet another explores methods for “actually *distributing* compositions in a way that allows listeners to experience the music algorithmically” (Levtov 2018, 628). Live coder Mike Hodnick won an “Emerging Composer Award” (Francisco 2014). For the live coder who sells “tracks,” “albums,” and other “releases,” and differentiates them using different labels and names, the products sold online function as musical works. Indeed, it would seem that many live coders produce works just like other composers.

On the other hand, many live coders argue that live coding – especially given its *live* nature – does not concern itself with works, let alone “great works,” “masterworks,” or *Gesamtkunstwerke*. As the website for the 2019 International Conference on Live Coding notes, live coding “encourages self creativity rather than cultural consumption.” If live coding does not produce any completed things then nothing exists to consume. As Alan Blackwell put it, live coding is always a “partial product,” never “finished” (2015). So how can we reconcile the view that live coding is never finished when live coding generates an abundance of cultural and commercial artifacts?

The philosopher Lydia Goehr published one of the most notorious ontological treatments of musical works in her 1992 book, *The Imaginary Museum of Musical Works*. Goehr’s book offered a nuanced, historically informed, investigation into

the genesis of musical works, which she believes took shape around 1800. Rather than declaring whether or not works exist, she instead focused on the origin of the *concept* of the work. While she offered some controversial ideas – such as “Bach did not intend to compose musical works” (Goehr 1992, 8) – that perturbed many a music scholar (e.g., Erauw 1998; White 1997), her differentiation between “musical works” and the “musical work-concept” is especially helpful for our purposes.

Rather than determining whether or not live coding produces works, we can examine how various ideas associated with the work-concept function in live coding performances. With this theoretical maneuver, we no longer require a definition of, or test for, a musical work. Works come with all sorts of theoretical baggage, such as “authorial intent,” “meaning,” and “genre.” It seems likely that a belief in ideas associated with the work-concept distract from a meditative live coding experience. If we *intend* to generate musical works while live coding then any thoughts about how to package, sell, or distribute the work would distance us from the live coding moment. If, while live coding, our thoughts wander and we become absorbed in concerns about how to represent our work in the future, then we have left the present moment. Comparing how the work being *created* on the stage compares to other previous works brings us from the present into the past. We need not label the work-concept with words like “moral” or “immoral,” but instead just notice how an intention to create musical works affects the meditative potential of our experience.

Not only does the idea of a “whole” or “created” work affect live coding, but so do our ideas about the parts of the work. For instance, we typically believe that works have beginnings and endings that serve specific functions. Goehr believes that beginnings create additional pressures: “The beginning must grab us, put us in the right mood” (2015). Likewise, it is commonly understood that “certain live coders, who rather than working towards some teleological endpoint, might even attempt to begin and end with nothing” (Cocker 2015). Indeed this practice is sometimes enforced strictly, such as in some live coding events that took place in Mexico: “The first sessions consisted of duos of live coders: one for sound, the other for visuals. The rules were quite strict, asking for the code to be written from scratch and that each performance couldn’t surpass the nine-minute mark” (Cárdenas 2018, 114). This structure therefore creates “rules” about the beginning, end, and length.

In other instances, it may seem that a musical performance transcends the work concept, but upon closer examination we find it lurking in the background, such as with some *indeterminate* music. For example, it might seem prudent to compare live coding performances to similar musical events, such as the “Happenings” of the 1950s and 60s. While no simple definition can capture the scope of the term Happening, we generally understand the word as referring to nonlinear events of an indeterminate nature that combined music, poetry, performance art, and other plastic arts. This definition feels equally applicable to live coding events that feature both musical and visual components. We could easily apply many definitions of a Happening to a live coding event, such as this one by Mariellen Sandford: “Happenings made the private process of art-making public and performative” (1995, Preface). And while Happenings and live coding events often require extensive preparation and training, both have reputations as improvised art forms. But as Michael Kirby, a professor of drama at New York University who published widely on Happenings, argued, “The action in Happenings is often *indeterminate* but not improvised” (1995, 8). Indeterminate music often relies closely on the notion of a work being performed. Another definition of indeterminacy describes it as practice with “no preferred solutions,” which nonetheless has “rules” that dictate a performance – much like a musical work does (Reynolds 1965, 136). Any sort of determinant structure that imposes rules – beyond obvious limits like the available sound transformations provided by a live coding language or the physical limits of production equipment – moderate the potential for live coding practices to cultivate mindfulness.

Comparable limits exist in any community that favors process over product, and other musical activities that fall under the big tent of “experimental music” have different sets of rules. The multi-media, experimental Fluxus events in the 1960s and 70s – which, in at least one instance included a meditation room (Higgins 2002, 202) – often followed scores. Even John Cage’s iconic, Zen-influenced 4’33” ends after about four-and-a-half minutes of silence. Michael Nyman, the highly regarded author of numerous books about experimental music, describes how many experimental composers think in terms of “rules”:

Experimental composers are by and large not concerned with prescribing a defined *time-object* whose materials, structuring and relationships are calculated and arranged in advance, but are more excited by the prospect of outlining a *situation* in which sounds may occur, a *process* of generating action (sounding or otherwise), a *field* delineated by certain compositional ‘rules.’ (1999, 4)

Meditative live coding cannot be rooted in notions of the musical work-concept or comparable concepts that would impose rules. If we have “live coding ‘covers’ of recognizable musical material” (Ogborn 2014, 25) then we just have a different work-concept exerting influence (rules) from outside of the present moment. We should admit that meditative live coding performances benefit from “rules” like those that govern sitting in a meditation hall – to avoid distracting movement, making unnecessary sound, lighting up a cigarette, or tickling the person on the adjacent meditation cushion – but at the same time observe the regulative effect of the limits imposed by the musical work-concept. These examples only begin to expose the influence of the work concept in live coding performance, but we must remember that the regulative function of the work concept is only limited by our imagination. Any thought that some essential component is absent from a performance detracts us from the live coding happening at that time, in that place.

3 Live Coding and Musicking

In addition to letting go of ideas about *musical works* during live coding events, we also would do well to let go of our ideas about *music*. If the goal during meditative live coding is to let go of judgment, then a music defined as “ordered,” “agreeable,” “expressive,” or “beautiful” sound offers nothing. This is a challenging project. To accept music as a “thing” feels as natural as accepting the “thingness” of a loaf of bread, so to conceive of music without “thingness” might feel as difficult as baking a loaf of bread without any things. However, for meditative live coding, we must adopt such a position, and shift emphasis from musical objects to musical activities.

Of course, descriptions about live coding producing *music* permeate live coding literature. Phrases connecting live coding with “thingness” abound, such as “the performer is creating music through live coding” (Blackwell 2015), “music is developed in real time” (Mooney 2015), or the “live coding of music” (McLean 2014). The live coding community describes their activities as “music making” (Stowell and McLean 2013) and “coding live music” (Magnusson 2011). The goal of the present study is not to make the case that these ideas are wrong, but instead to recontextualize live coding in a way where art objects do not take center stage.

We can begin by asking, what kind of object is music? Some music scholars (including musicologists, music historians, music theorists, ethnomusicologists, and others) struggle to explain *what music is*, much like a live coder might struggle to explain *what live coding is*. It is not novel to suggest that music is not a thing. For instance, the influential feminist music scholar, Susan McClary, admitted, “I am no longer sure what MUSIC is” (1991, 19). The prominent American musicologist, Rose Rosengard Subotnik wrote, “the entire field of Western musicology seems to have entered ‘an era of post-music’” (1996, *xix*). The New Zealand-born ethnomusicologist, Christopher Small, concluded, “There is no such thing as music” (1998, 2).

In fact, Small published a book in which he argued that we should understand the term “music” as a verb rather than as a noun, as an *activity* not a thing. He coined a new term to describe this activity: “musicking.” While some music scholars dismissed Small’s idea as simplistic others embraced the term and we now have hundreds of articles and a half-dozen books with “musicking” in their title (e.g., Reily and Brucher 2018; Balen 2017; Rahaim 2012; Tift 2007). Small provides a variety of arguments, useful to the present study, for how we benefit when we place less emphasis on musical objects and more attention to the connected nature of humanity.

Live coding is an activity. During meditative live coding we have little use for music as a thing to possess or treasure. Nor can we treat live coding as something to give away in any tangible sense. While saving code and repeating a performance surely would be possible technically, the richness of the original performance would be unavailable in a recreation and the second performance would stretch our definition of *live coding*. To pay attention to live coding is to let go of objects and simply observe.

Observing the activities that contribute to live coding performance highlights the importance of *human relationships*. It may seem that a meditative live coding experience would concentrate primarily on sound, but when we let go of musical things and shift our thinking to musical activities, we find human beings producing sounds, dancing, and responding in other ways. We notice the connected nature of the moment. As Small wrote,

“Musicking is about relationships, not so much about those which actually exist in our lives as about those that we desire to exist and long to experience: relationships among people, as well as those between people in the rest of the cosmos, and also perhaps with ourselves and with our bodies and even with the supernatural, if our conception of the world has room for the supernatural.” (183)

A meditative live coding experience allows us to notice sound, our bodies, relationships, and everything else around us in the moment. However, Small seems to want musicking to take the focus away from relationships that “actually exist” and instead notice our desires. For our pragmatic approach to live coding we let go of desire and observe the world as it actually is. We cultivate the idea that the people participating in the live coding event at that time are exactly the “right” people and that nothing needs to be changed.

This focus on musicking rather than music also serves to highlight the importance of the *event* of live coding, shifting our attention from *existing* to *doing*. When we participate in a live coding event, we act together. Our activities may feel distinct, but we can now connect them with the verb musicking and foreground the fact that every person at the event is contributing. When people attend algoraves, concerts, and other live coding events they are choosing to gather with other humans rather than simply observe live coding online. Small believed “The fundamental nature and meaning of music lie not in objects, not in musical works at all, but in action, in what people do” (1998, 8). For live coding what we do varies from event to event, but in each case we participate. With meditative live coding, we observe our participation in the event.

The act of discarding our attachment to musical objects and instead just observing our relationships to other people at live coding events encourages *empathy*. Not only do we notice our connection to the people and the things around us, but that

our actions have consequences. This shift in attention encourages us to use live coding wisely, for the benefit of all. Small writes in *Musicking*: “The purpose of this way of knowing is not to dominate the world, as is that of scientific knowledge, but to live well in it” (1998, 50). The purpose in distancing live coding from things is not just an intellectual exercise that replaces one label with another. People habitually attach to enjoyable things and hold on to them for as long as possible. When other people share their experience with us at a live coding event, we give them the gift of our presence. Rather than struggle with others, we use the activity of meditative live coding to connect with others and with ourselves.

Our society commonly accepts the act of fabricating – of creating – as an essential and definitive human activity. When we meet someone new, the first question we ask is “what do you do?” by which we mean “how are you economically productive?” Very few people could honestly answer this question, “by live coding.” But the very fact that meditative live coding produces no things gives it power. It involves no things to desire or dislike. It’s neither attractive nor ugly. When we accept live coding as an activity that allows us to be clearly aware, rather than as a process of musical thing making, we can more fully connect to the world. The occasion of live coding offers an opportunity to observe but does not provide answers to questions. Live coding functions as an instrument that exists in time, always moving forward, and we cannot expect any particular result from live coding. Nothing about the experience or imagined thingness of live coding is necessary. As Small points out, “everyone’s musical experience is valid” (1998, 13). When we shift our thinking away from musical objects toward observing activities, relationships, and events then we reduce the requirement to accomplish or gain, and create space to experience.

4 Live Coding and Hermeneutics

Of course, even if we abandon ideas about musical works and music, we can still find ourselves at a live coding event shackled by a belief that we must analyze the performance. Trying to determine what is *really, truly* happening while live coding only distracts our minds and brings us out of the moment. Live coding is not an abstract practice. It’s not haughty. The manner in which we spend our time live coding has real consequences. It’s a chance to observe what William James called the “rich thicket of reality” (1907, 68). And yet often we can’t help ourselves from believing that something *more* exists, beyond what we observe, and to succumb to our conditioned desire to reveal something hidden. To merely *observe* our practice and the sounds we produce, and to avoid our desire to find meaning, is a practice that challenges even the most patient minds.

Like Christopher Small, the American musicologist Carolyn Abbate has championed a shift in attention away from works to performance. In a widely-discussed article, Abbate tested “the conviction that what counts is not a work . . . but a material, present event” (2004, 506). More than just question the notion of musical works or music, Abbate questions the act of interpreting music, what we also call musical criticism or hermeneutics. One of Abbate’s critics pithily reduced her position to “performance good, hermeneutics bad” (Puri 2006, 491). While it may feel perfectly natural to find “hidden messages” in musical works, music, and musical activities – such as live coding – Abbate reminds us that “hermeneutics fundamentally relies on music as mysterium, for mystery is the very thing that makes the cultural facts and processes that music is said to inscribe or release (therein becoming a nonmystery) seem so savory and interesting” (2004, 521).

Abbate, like Small, is invested in the notion of the musical event and finds value paying attention to the present moment. She writes:

While musicology’s business involves reflecting upon musical works, describing their configurations either in technical terms or as signs, this is, I decided, almost impossible and generally uninteresting as long as real music is present – while one is caught up in its temporal wake and its physical demands or effects. (2004, 511)

Abbate believes that analysis deprives our experience of performance, and we could extend this idea to live coding.

The persistence required to actually pay attention – to not analyze – during each moment is especially difficult, and even more so while we listen to a musical performance. Indeed, another critic of Abbate deems present moment awareness untenable: “It is simply not the case, as Abbate seems to think, that in experiencing a performance we are, or could be, completely absorbed in the present and can avoid substituting what is absent but imagined for the real sounding presence” (Berger 2005, 497). If this reviewer was correct, to seek a meditative live coding experience would be a pointless endeavor. So it is precisely this processing of “substituting” that we must overcome.

While it may seem to one reviewer an insurmountable task, we can look more practically at what it would take to develop such an awareness. For one thing, we might differentiate different kinds of analysis. Our minds may have a tendency to wander, but our speech and actions need not follow. Keith Rowe, a member of the improvisatory band AMM, reminds us that we can choose not to talk about our analyses when he describes how the members of his band would interact:

Then we got, I think, to an optimum period where we could just go and play, and we didn't feel we had to analyse or even discuss [and we] would travel to a gig in a vehicle for maybe six hours and not discuss the music once, set up and play, then six hours back and still not discuss the music! And never talk about it again, except that someone might feel happy, and someone else might feel not so happy, and that went on literally for years. (Prevost and Rowe 1982, 37)

Our thoughts influence our actions and our actions influence our thoughts. We can reduce our mind's tendency to wander by training ourselves to not always speak about or write down all of the places our minds wander during a live coding performance. In other words, our actions before and after live coding affect the meditative potential of our live coding practice. Trying to force our minds from wondering is an essentially pointless pursuit, but creating the conditions for non-resistance to whatever arises is not, and AMM's practice of non-analysis is but one practical example.

Another strategy for keeping focused during a meditative live coding experience is to notice the physical objects in the world, in their crass, material form. When the real world consists of laptops, cables, speakers, and other physical objects, idealizing it has no practical worth. When we analyse, we tend to move away from the practical and material to the merely theoretical. Instead, we can notice how analysis affects live coding and how it transfers our focus away from the world and the activity at hand.

For the pragmatist, any finding can be "true," and pragmatism entertains any hypothesis or analysis and measures its practical consequences to determine what improves experience. In fact, William James argued that we cannot separate "what is better for us, and what is true for us" (1907, 77). James's somewhat radical view sees no difference between "true" and "better," and that if we notice a particular action offers a benefit, it must be "true." His primary exception to this claim would be if "*the belief incidentally clashes with some other vital benefit*" (1907, 77). If we found it "better" to practice live coding late at night with the amplifier turned all the way up, which in turn disturbed the neighbors, got us evicted, and caused hearing loss, it would no longer be "better." Rather, this formulation gives us the courage to explore our meditative live coding practices without fear that what we discover could be "false," and each of us has the ability to determine the usefulness of works, music, and hermeneutics.

5 Conclusion

Some of the claims in this paper might seem a significant departure from an academia that prides itself on uncovering hidden meaning, as revealers of truth. This pragmatic approach discards a reified conception of live coding and replaces it with a meditative live coding that does not require works, music, or analysis. It's a liberating attitude. While these ideas could influence any style of live coding, from the concert hall, to the night club, to the classroom, and the home, they also allow us to experiment with practices that might further close the gap between meditative live coding and seated, silent meditation.

Consider, for instance, the impact of an already-existing actual musical activity that embodies all of these ideas – a musical praxis without works, music, or analysis. Practitioners of Pāli-language Theravāda (Buddhist) chanting use chanting specifically for the cultivation of mindfulness and do not describe the sounds they produce as "music" (Greene 2004, 45). Further, some believe the actual "vibratory sounds" of the Pāli (an ancient language similar to Sanskrit) chanting have the power to soothe "the nerves and induce peace and calm of mind," as well as "bring about harmony to the physical system" (Thera 1980, 16). It may seem that a live coding event that used Pāli chanting as musical material rather than one that consisted, for example, primarily of kick drums and bass would be well positioned to amplify the event's meditative ethos.

We could take this line of thinking further. When Theravada Buddhist monks, nuns, and other people chant something called the *Metta Sutta*, it provides them an opportunity to practice "loving kindness" or "friendliness." The words, chanted in the Pāli language, suggest we treat everyone with respect and encourage us to send positive energy towards all beings, including our family, friends, co-workers, neighbors, enemies, and animals. This style of chant, like meditative live coding, aims for specific, practical consequences. It's not a requirement that anyone chant the *Metta Sutta*, nor is it a religious ceremony. It's pragmatic, and over thousands of years people have found it more difficult to get angry with others while also regularly, and genuinely, wishing everyone to be well, happy, skillfull, and peaceful. The pragmatic benefit of chanting the *Metta Sutta* is improved relationships with one's self and with others. The sounds of the *Metta Sutta* may seem far removed from other live coding samples, but of course it's just as easy to loop them, distort them, change their pitch, and perform all of the kinds of operations normally employed during any live coding experience. Cultivating good will for the entire cosmos may seem daunting, but overcoming greed and hatred is not a process that usually happens overnight, so the repetitive nature of live coding could offer a new way to share and experience these words.

However, the musical tradition with perhaps the closest relationship – what the philosopher Ludwig Wittgenstein termed *Familienähnlichkeit* or "family resemblance" (1953) – to meditative live coding is free improvisation. Closely related to free jazz, and often associated with musicians such as John Zorn, Anthony Braxton, and Derek Bailey, free improvisation is

known for its lack of rules. Free improvisers may start from a text and gradually move away, but more frequently they discard notions of the musical work entirely, as with groups such as the Spontaneous Music Ensemble.

Likewise, the aforementioned British free improvisation group AMM never rehearses and its members do not discuss past performances. AMM member Cornelius Cardew compared written compositions (works) to improvisation in this way:

Written compositions are fired off into the future; even if never performed, the writing remains as a point of reference. Improvisation is in the present, its effects may live on in the souls of the participants, both active and passive (i.e. audience), but in its concrete form it is gone forever from the moment that it occurs, nor did it have any previous existence before the moment that it occurred, so neither is there any historical reference available. (1971, xvii)

Cardew's ideas about the impermanence of sound, and the pointlessness of trying to hold on to sound, resemble the goals of the meditative live coder. In both cases we let go of the sound produced on the stage in order to pay attention to the present. Such a task requires a level of effort described by the experimental composer and improviser Christian Wolff:

For one's own working, experiment entails certain dispositions, for example, unwaveringly close attention to everything: no dimension of the material to be neglected or taken for granted, not necessarily that all of it be used but that it be there as a possibility. (2009, 437)

Few would dispute the high level of concentration required to pay "unwaveringly close attention to everything," but this is precisely the goal of meditative live coding. Wolff's comment serves as a reminder for why we use the word "practice" to describe live coding activities. To feel truly unattached to the sounds – to produce the sounds and also view them as "not my sounds" – requires that we alter basic conceptions about musical works. Wolff asks us to stay in the moment, which requires less effort when we view a live coding event as consisting of activities that do not have to produce certain things or conform to imagined rules governing musical works. While every live coding experience is limited in some regard – even when live coding at home, we must eventually eat, sleep, or go to the bathroom – we can learn from these ideas about impermanence, paying attention, and the conscious effort required to head off distraction.

We must never judge a live coding experience to be a failure, a success, or even neutral. The reality is that to "just pay attention" is as difficult as it is simple. It goes against our cultural conditioning to suggest that musical output does not carry any information and that it does not mean anything. But if live coding is to become a meditative experience that cultivates mindfulness, then we can start by recognizing how our ideas about musical works, music, and interpretation affect our experiences. Thankfully, it is difficult to cling to ideas that contradict practical experience, so even just the slightest moment of experiencing a live coding event without judgment can have a lasting, positive impact.

6 Acknowledgments

Thank you to Lullabot for funding this research.

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