To play with feeling? The opportunity of aesthetics in computational musical creativity

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Introduction The research field of Computational Creativity (CC) has been defined as "The philosophy, science and engineering of computational systems which, by taking on particular responsibilities, exhibit behaviours that unbiased observers would deem to be creative." [3, §1] CC research is not restricted to artistic activities (e.g., mathematics is included), but artistic domains distinguish it most from conventional Artificial Intelligence (AI), partly because they position CC closer to questions about aesthetic consciousness. In this position paper, I argue for music as an object of scientific study, arguing that it is an ideal domain for both CC and machine consciousness research.

What is music? Music comprises many distinct aspects. Babbitt [1] proposes three representational domains for music: *graphemic* (notated); *acoustic* (physical); *auditory* (cognitive). Affective response resides in the auditory domain.

Babbitt's domains help describe musical operations [13]. The auditory is privileged: absit musical intelligence, moving from the graphemic to the acoustic entails literal recording and playback. Where a human is involved, the auditory mediates: performing a musical score entails cognition [13, 12]. From a CC perspective, excluding the auditory entails triviality.

Further, music's syntactic forms are *defined* and *constructed* by perceptual and cognitive processes [13, 12, 14]: listening and memory. Musical syntax is complex, multidimensional, and deeply hierarchical. Music uses reference in ways similar to anaphora in language. But music is usually self-contained: it hardly ever refers directly to things that are non-musical.

What does music mean? Syntactic features of music have direct psychomotor effects: music makes people want to move—but the effect is subtle, and related to timing in language [8, 6]. Humans enjoy and actively seek the engagement out, even when the emotion is (superficially) negative [9]. We distinguish between affect *suggested* to, and affect *felt* by, a listener [11]; music suggests an interesting ability to be affected by something and to simultaneously reflect on that effect.

Music differs from language, in that it has no propositional, compositional semantics: it makes no statements *about the world*. It is thus a closed system, referring to itself [4], conveying affective connotation, but not epistemic content.

Consciousness Therefore, music affords a unique opportunity to study cognitive effects that are directly related to conscious experience, without the baggage of general knowledge that cognitive science generally carries. Specifically,

- syntactic effects seem to engage entrainment and thus affective response [6];
- syntactic and semiotic effects seem to directly engage affective response [5];
- powerful expectations are generated, which are sometimes describable by conscious awareness, and which engage affective response [10];

– conscious and non-conscious awareness of the meta-level seems commonplace: dynamic expectation is a major factor in musical experience [8, 7].

Relatively little work on music is available in machine consciousness studies [2]. Such work would be a true symbiosis: music affords a purpose-built laboratory in which consciousness studies can cut directly to the mechanisms; consciousness studies afford detailed understanding of aesthetics (qua "feelings") which are not normally available for consideration in music theory.

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