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## **Affective resonance**

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This article introduces the concept of affective resonance, which names a type of affective dynamics of reciprocal modulation between interactants. Resonance arises through a complex interplay between capacities to affect and be affected of multiple things and individuals, and in this interplay, active and receptive affects are inextricably entangled. Affective resonance is thus based on a fundamental reciprocity at the level of the causality of affect, while at the level of the resulting forms and contours, resonance dynamics may be complementary, or even asymmetric, which distinguishes resonance from imitation and synchronization. The concept is presented in the context of a relational and dynamic understanding of affect on the basis of Spinoza and Deleuze. The legacy of the concept in physics and the relation to neighboring concepts in affect studies, philosophy and developmental psychology is briefly discussed.

### **1. Introduction**

Affective resonance is a type of relational dynamics of affecting and being affected, characterized as a process of reciprocal modulation between interactants. Resonance is a relational and processual phenomenon, it may neither be described as a singular affective “state” nor as a one-sided transmission of affect, such as in contagion. Resonance arises through a complex interplay between → affective dispositions (Mühlhoff 2019) of multiple individuals and contextual factors within an → affective arrangement. In this interplay, active and receptive affects are in a permanent coupling that cannot be explained as a chain of unilateral actions (A affects B, then B affects A and so on). In particular, resonance differs from echo and mirroring because it creates its own affective quality in a ‘non-linear’ interplay of the affective dispositions of all individuals involved.

Phenomenologically and from the first-person perspective, a resonance dynamic is primarily intensive, or force-like (“gripping”, “carrying away”, “explosive”, etc.). Affective resonance is a subtle and ephemeral phenomenon that pervades most face-to-face social interaction. The concept is geared primarily towards explaining dyadic and small group interactions rather than masses and large scale affective dynamics, although mass affects can also be seen as an example of resonance. Elementary cases are the mutual modulation of facial

expressions and gestures, or of melody, intonation and accent of language during a conversation or in a persistent relationship. By conceptualizing these examples as cases of affective resonance, one can see that the affective coupling mutually transforms the interaction partners, making resonance more than mere contagion or synchronization of affective states. Since resonance is a dynamic coupling at the causal level of affecting and being affected, the affects in which a resonance dynamic manifests ‘on the surface’ for different individuals do not necessarily resemble each other, though they are jointly co-created and shaped by the relational interplay.

Resonance is thus characterized by a fundamental reciprocity on the level of the causality of affect. However, this does not imply that this dynamic is symmetrical at the level of the resulting affects. This has important systematic consequences, as resonance can then also manifest as asymmetric or complementary affective entrainment between individuals, such as the dynamic constitution of different ‘affective roles’ in group dynamics or asymmetric but dynamically stabilized patterns in couples. From a social theory perspective, affective resonance can therefore be used to explain the dynamic emergence of micro-social patterns and differentiated ‘affective roles’, as well as subtle, non-repressive but modulating forms of power relations in small groups, such as families or work teams. This, generally, makes resonance an ambivalent phenomenon and striving for resonance *per se* is neither a political maxim nor an ethical ideal.

*Example: “Affect attunement”*

Paradigmatic examples of affective resonance can be found in empirical studies of the infant-caregiver dyad. In particular, the concepts of “vitality affects” and “affect attunement” coined by the American developmental psychologist Daniel Stern (1985) are precursors of the philosophical concept of affective resonance proposed here.<sup>1</sup> Stern starts from the hypothesis that infants in their first weeks cannot distinguish different things, such as objects, persons, colors or shapes, nor are they able to read affective expressions such as joy, fear, sadness, disgust etc., but rather experience *temporal* contours, rhythmic patterns and intensity gradients that can underlie all sorts of actions, gestures, mimics or tactile sensations. In distinction from “categorical affects”, Stern terms these dynamical qualities “vitality affects”. As intensity contours, they are best described in “terms such as ‘surging,’ ‘fading away,’ ‘fleeting,’ ‘explosive,’ ‘crescendo,’ ‘decrescendo,’ ‘bursting;’ ‘drawn out,’ and so on.” (Stern 1985: 54)

Based on this, Stern also shows that there are reciprocal processes of affecting and being affected that take place solely in the register of vitality affects. Stern observes such dynamics between infants at the age of nine months and their caregivers and calls them “affect at-

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1 Daniel Stern was directly received in affect studies and philosophy, see Angerer et al. 2014; Gibbs 2010; Guattari 1995; Hansen 2004; Manning & Massumi 2014; Massumi 1995, 2002; Papoulias & Callard 2010; Wetherell 2012.

tunement” (Stern 1985: 138–161). As a form of “intersubjective sharing of affect” (ibid.: 141), affect attunement operates as a matching of temporal patterns and intensity contours, but is different from mere imitation, as it does not show perfect symmetry or “mirroring”. Affect attunement is not just about copying the child’s vitality affects, but about integrating one’s own affects into a dynamic of mutual attunement which then creates a new, shared affective experience.

It is this idea of a dynamically and inter-affectively co-constituted quality of being-in-relation that makes affect attunement an example of affective resonance. Stern’s affect attunement is (1) a truly bi-directional coupling, (2) it constitutes an experiential quality of its own, and (3) it is experienced immediately as force-like dynamics, not as categorical affects; hence it shares all structural properties of resonance (see below). Moreover, according to Stern, the specific capacity of affect attunement is acquired around the age of nine months and is never lost again. Even in adult life it is active, though not always consciously, so that affect attunement underlies all kinds of daily interactions between adults. In fact, the disposition to engage in affect attunement constitutes a fundamental domain of social relatedness. This ultimately provides a central insight about the relevance of affective resonance for the genesis of subjectivity (see Guattari, 1995; Mühlhoff, 2018).

## **2. Origin of resonance in classical physics**

The concept of resonance has its origins in the physics of mechanical and acoustic vibrations, where it describes a particular phenomenon in the interplay of multiple oscillating systems. A detailed look at some of these physical phenomena will reveal three features of the resonance concept, which also apply to resonance in the realm of affectivity. Resonance in classical mechanics refers to the fundamental observation that the degree to which an oscillatory system can be induced to oscillate by coupling to another oscillating system is highly sensitive to the frequency of that other system (Tipler, 1999; Morse, 1948). For example, the extent to which a child on a playground swing can be made swinging depends on the frequency of the periodic pushes exerted by another person or by the child’s own legs. Simple systems usually have *one* specific frequency, called resonance frequency, at which it can much easier be induced to oscillate than at other frequencies. In resonance, the coupled system hits precisely that frequency. Resonance is thus a very specific and selective case of interaction in which the least effort has the greatest effect in terms of induced vibration.

The most interesting cases of resonance occur when multiple oscillating systems are coupled to form, as a whole, a new dynamical system. Such composite systems can enter a state of (internal) resonance which mutually modulates the oscillations of each subsystem. This is the case, for example, with the three Jupiter moons Ganymede, Europa, and Io, which in terms of their rotation around the planet are in a state of “orbit-orbit resonance”, as it is called in celestial mechanics (Murray and Dermott 1999, 9; see also Mühlhoff

2015, 2018). Empirical observation shows that Io turns exactly 4 times, Europa 2 times faster than Ganymede. These exact integer ratios deviate from what is obtained when the individual rotation frequency of each moon is calculated using Newton's law of gravitation. In reality, moons do not rotate individually around the planet, but influence each other through their reciprocal gravitational forces. They are in relations of mutual affecting and being affected by one another which are perfectly simultaneous with respect to activity and passivity. This entanglement of moving and being-moved in relation causes the moons to mutually modulate each other in their rotational frequencies. This is a phenomenon of resonance, and interestingly, it is a case where resonance does not result in *identical* motions because the frequencies of the moons remain different.

As it turns out, the solar system is full of such rotational resonance couplings, and that makes it dynamically *stable*. Through orbital resonance, the various rotational objects jointly establish a dynamic in which each of them behaves somewhat differently than in the case without interaction ('individualistic case'). But in turn, this dynamic being-in-relation, as a whole, is mutually stabilizing in the sense that it can withstand minor a-periodic perturbations, such as asteroids and comets passing by. This example shows how resonance in classical physics describes a joint dynamic of elastically coupled sub-components that is only apparent as a whole.<sup>2</sup> In resonance, these sub-components are held together in an interplay of moving and being-moved, of dynamically constituted mutual forces that unite the individual objects or systems in a joint motion, thereby constituting a new quality of relational stability. This suggests that resonance is more than a mere correlation or synchrony of temporal patterns that can be observed from an external perspective. The core of resonance is that it is a dynamic of *inherent* forces that can only be directly experienced in the immanence of its interplay. In resonance, each of the moons is, as it were, slightly in the grip of the other moons.

In putting the concept of resonance to use in affect theory, I do not mean to describe dynamics of affect *as* physical phenomena. Rather, the philosophical and affect theoretical concept of resonance can be obtained by transposing the physical concept into the domain of an affect theoretical ontology. This is to say that affective resonance and physical resonance share some of their key structural properties. These structural properties are: 1. Resonance is based on a simultaneity of affecting and being affected, which prevents decomposition of the process into chains of unilateral impacts. 2. Resonance is an inherent dynamic of forces and causal couplings, as opposed to an external observation of correlations. 3. Resonance constitutes a dynamic quality that is more than a sum of individual contributions and thus pertains to the whole (cf. Mühlhoff, 2015, 2018).

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2 What I am discussing here is resonance not in the narrow sense of the asymmetric model case of "forced vibrations", but in the full sense of multi-directional couplings. See on the physics Morse 1948.

### 3. Systematic elaboration: Thinking resonance in a Spinozan ontology

The concept of affective resonance can be developed in the framework of a Spinozan ontology of affect (see Spinoza, *Ethics*), of which two aspects are particularly relevant. First, affect in Spinoza is an ontological principle; every individual (“modus”) is constituted only through affective relations ( $\rightarrow$  affect). Second, affect in Spinoza always occurs in relations of affecting and being affected; affect is relational and always situated. Each individual is in fact attributed a specific capacity, or power, to affect and be affected, which Spinoza calls *potentia*. This *potentia* is not an innate property of the individual, but the product of past relations of affecting and being affected, which is why I refer to the *potentia* as the  $\rightarrow$  affective disposition (Mühlhoff 2019) of an individual.

In this setup, the concept of resonance can be formalized by looking into the question of what kind of dynamic unfolding could arise when two or more individuals with their specific affective dispositions are co-present in a given situation. To this end, I will use a specifically dynamic reading of the Spinozan ontology obtained through the connection with ideas from Gilles Deleuze and Henri Bergson. “Dynamic” means that a concept of *forces* is introduced that is ontologically primary to states and statically individuated forms. Discussing affective *dynamics* instead of just *processes* of affecting and being affected emphasizes that these processes are essentially an unfolding of relational forces and not just sequences of transitional states.<sup>3</sup> Resonance is a dynamic concept as in the perspective of the individual, it is experienced immediately as a force-like entanglement of moving the other(s) and being moved by the other(s); it is a movement-in-relation which is only partly under my control. In the unfolding of resonance, I contribute to a group dynamic and at the same time I am gripped by it. The dynamic acts on me, it makes me move – not in an externally determined way, but in my own way –, and thereby it gets enacted by me, I carry it further. Although the affects of each individual may be different, the affective quality of being-in-resonance is not a composite of individual affective states, but something that happens between individuals.

To account for this, an ontology of differential forces can be imported into the Spinozan ontology of affect. For this purpose, the concepts of *virtuality* and *actualization* known from Henri Bergson and Gilles Deleuze (cf. Deleuze 1991, 1994) are particularly useful. Bergson uses the concept of “the virtual” when he considers the question of biological evolution as a process that continuously produces new forms that are not pre-conceivable as possibilities from the present stage within the process (see Bergson 1907). So he faces a problem quite similar to ours: The forces that drive a process are more than the set of states (or manifest forms) that the process runs through. Bergson characterizes evolution as

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3 This refers to the fundamental distinction of dynamics and kinematics in classical physics. Kinematic descriptions of motion do not use a concept of forces but only the geometric ideas of straight lines and reflections, thus of singular transactions such as collisions of Billiard balls or bouncing off from a wall. The situation of the Jupiter moons could not be described in kinematic terms.

an “elan vital”, as “the force of time as production of novelty” (Guerlac 2006: 189). He calls this force *virtual*, as it precedes the *actual forms* it could bring about.

In Deleuze’s reading of Bergson, this notion of the virtual undergoes an abstract theorization as an ontological register of pure forces or “differential elements” built into an immanent philosophy that is compatible with (and in fact, inspired by) Spinoza’s immanent ontology of affect (see Deleuze 1991: 94–103; 1994: 208–214; cf. Guerlac 2006; Protevi 2013). The conceptual opposite of the virtual is the *possible*, because both concepts are connected to different notions of processuality. A possibility undergoes the process of a “realization”, which Deleuze characterizes as a “brute eruption” or a “leap” from non-existence to existence (Deleuze 1994: 211), it is thus a process that limits the arising real thing to resemble that which is logically pre-conceivable as a possibility. The virtual, on the other hand, undergoes a process of “actualization”, reminiscent of how a force performs work in physics. Instead of instantiating resemblance to a possibility, actualization is an open process that creates its own path of action and is productive in its unfolding (Deleuze 1991: 97) Unlike a possibility, a virtuality does not contain in its essence a reference to a target point of its process of actualization. Thus, if the dynamic forces of resonance are considered virtual, this is to locate them in an ontological register that is independent of the manifest affective qualities through which they appear ‘on the surface’.

As already mentioned, the forces that drive a resonance process result from the affective dispositions of individuals, that is, from their capacities to affect and be affected in the immanence of a given affective arrangement (→ affective disposition / Mühlhoff 2019). It is crucial that Spinoza’s concept of *potentia*, on which the concept of affective disposition is based, refers to a relational embedding. That is, an individual’s capacity to affect and be affected depends not only on past relations, but also on the present relational configuration. Hence, this capacity must be conceived of as a virtuality as it does not contain, *in itself*, the actual affective contours in which it unfolds. Putting this together, resonance is (1) a dynamic of relational forces, and as such it is rooted in a virtual register of being-in-relation; (2) these forces result from affective dispositions of the individuals involved; and (3) the actual affective qualities in which this dynamic of forces results are not pre-conceivable from the mere sum of individual traits, they result from a non-linear interplay of forces in an open process. Resonance is thus a process of *actualization* in a relational field of potentials to affect and be affected that is jointly constituted based on the affective dispositions of individuals in an affective arrangement (see Mühlhoff 2018).<sup>4</sup>

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4 Gilbert Simondon, too, has a concept of (internal) resonance that has strong similarities with the one developed here, see Simondon 1989, 2009. However, it is under dispute how compatible Simondon’s thinking is with the immanent philosophy of Spinoza; see Del Lucchese 2009: 182. See also Mühlhoff 2018: 134–150 for more details.

## *Resonance and dissonance*

As we have seen, in a process of resonance, the affective power (*potentia*) or disposition of an individual manifests in a specific way. The term “specific” is intended to indicate that it depends on the resonance constellation and thus on all other individuals and the surrounding affective arrangement, how exactly the *potentia* of a particular individual can unfold in it. Therefore, resonance is a process of modulation that transforms everyone a little by amplifying some aspects of their disposition and weakening others, and thereby creating something new. Building on this idea, we can now introduce further differentiation by taking into account that in Spinozism affects are always evaluated according to whether the power of acting of an individual is “increased or diminished, aided or restrained” (Spinoza, *Ethics*, part 3, def. 3). A resonance dynamic that modulates the individual will always partially increase and partially weaken one’s *potentia*. Nevertheless, one can make out the special case of an *overall* restraining and weakening resonance dynamic. This case can be referred to as *dissonance*: Dissonance is the *sub-case of resonance* in which the virtual force field is experienced as aversive, divisive, destabilizing, or even explosive and destructive. Moreover, one could now oppose the concept of dissonance to a concept of resonance in the proper or narrower sense, which then designates the special case of general resonance, in which the reciprocal amplification of the *potentia* of *all* individuals clearly predominates.

### **4. Related concepts in affect studies**

A variety of concepts have been used in affect studies and other disciplines to describe relational dynamics of affect. In the following, I will pick out some of them to briefly point out similarities and dissimilarities with the proposed concept of affective resonance.

A first group concerns concepts of affect *transmission*, including *emotional/affective contagion* and *suggestion* (see Le Bon 1895; Gibbs 2010; Tarde 1890; and for a historical analysis, Blackman 2012) as well as the transmission of affects by means of “chemical or nervous entrainment” (Brennan 2004). These concepts tend to evoke the idea of one-way transmissions. “Contagion” comes with a strong connotation of a split between active and passive roles, where the passive individual is haunted, hit, or infiltrated from outside by an affective influence originating from the active part. The semantics of contagion and transmission suggests that the result of this process is a synchronizing “copy” of the affective state of the “sender” in the “receiver”. Also the concept of *circulation of affect*, which has been used by a number of scholars (Ahmed 2004a,b; Clough 2007; cf. Blackman 2012; Wetherell 2012), comes with a semantic connotation of a one-directional mechanism underlying the circular movement of affects. In particular, this is the case when affect is conceived as a state into which an individual can enter or not. If what causes such states is transmission of affects, then circulation is only a more elaborate form of transmission. As

Wetherell puts it, “‘circulation’ suffers from similar problems if it implies that affect is an ethereal, floating entity, simply ‘landing’ on people” (Wetherell 2012: 141). The concept of resonance, in contrast, aims to focus on the reciprocity of the processes on the causal level, so that the resulting affect qualities are bi-directionally co-constituted, while they potentially manifest in complementary and a-synchronic forms.

A second group of related concepts are various notions of emotional and affective *atmospheres* (see Anderson 2009, 2014; Böhme 1993; Brennan 2004; Latour 2003; Schmitz 1994; Stewart 2011; for an overview: → atmosphere / Riedel 2019, Seyfert 2011). While the exact conceptions vary in detail across disciplinary and cultural borders, atmosphere tends to refer to a form of temporary organization of a field of heterogeneous elements and forces. In the anglophone discourse, the term is often used “vaguely and interchangeably with mood, feeling, ambience, tone and other ways of naming collective affects” (Anderson 2014: 137). The German tradition deriving from Herman Schmitz, in contrast, understands atmospheres more starkly as ethereal, non-localized entities that float through everyone and may even “wield authority over the entirety of bodies in a situation” (→ atmosphere / Riedel 2019). In this particular strand, atmospheres come with a connotation of authority or dominance, suggesting that they can impose certain moods or feelings on individuals (“*eine Atmosphäre herrscht*”). Resonance also refers to a form of collective affect and thus shares a phenomenal scope with the more general understanding of atmospheres as mood or ambience. More specifically than that, however, affective resonance names a dynamic of *multi-directional causal interaction* from which this collective affect results and which is not necessarily present in all examples of affective atmospheres. Comparing to the stronger understanding of atmosphere in the German phenomenological tradition, affective resonance can as well be used to analyze structures of power and influence for instance in modern work places (Mühlhoff 2018, Mühlhoff & Slaby 2018). Yet one cannot say that resonance was reigning or dominating a situation (“*es herrscht Resonanz*”) as resonance emerges “bottom-up” and in an immanent interplay of a multitude of individuals. While atmosphere often comes with a connotation of embeddedness-in and/or exposition-to, resonance arises as an inherent quality from a web of horizontal relations of a potentially open milieu.

A third group of related concepts is formed by the notions of *imitation* and *mimesis*, which are often used in affect studies and other areas (Blackman 2012; Bösel 2014; Brennan 2004; Gibbs 2010; Seyfert 2012; Thrift 2008). In particular those contributions that derive their concepts of imitation or mimesis from the work of Gilles Deleuze provide an elaborate understanding of mimesis as an intensive and constitutive process of joint becoming. Imitation is then not just a superficial simulation of identical shapes and contents, but deeply modulates and transforms the individual without making it identical to the imitated thing (Kwek & Seyfert 2015). If mimesis can be understood as process of mutual (that is, multi-directional) imitation, it resembles the concept of resonance in terms of causal reci-



procity. At the level of forms, however, there is a difference to the resonance concept, because mimesis and imitation are generally convergent, or synchronizing processes. Unlike resonance, imitation and mimesis do not cover cases of asymmetrical attunement of affective contours. Consequently, imitation and mimesis could be considered as the synchronizing special case of affective resonance. Or, in other words, affective resonance could inform a causal and affect theoretic approach to how mimesis operates. However, there are asynchronous, disruptive and chaotic cases of resonance that are clearly beyond the phenomenal scope of mimesis and imitation.

## 5. Applications and Outlook

Affective resonance in the way it is treated here takes place primarily in the bodily co-presence of individuals. In further investigations it has to be clarified how resonance can be understood in the context of media techniques. Of course, affective resonance also occurs in situations in which the individuals are not physically present but affect each other e.g. through a social medium. A crucial point here, however, would be to understand the medium not just as an amplifier and transmitter of affect, which merely increases the range of local dynamics to a global scale. Rather, it must be assumed that the media have a specifically formative and constitutive role for the affects and affective resonances that are possible therein. Media create resonance spaces that can have their own, technically and socially conditioned resonance properties, which could lead to completely new dynamics (the tradition in media theory that builds on Simondon seems particularly promising in this respect, cf. Hansen, 2001; Angerer et al., 2014). A related question is whether a variant of the concept of resonance can also be used for the situation of non-real-time media, for example in the context of the reception of films or novels, where one can not assert that the affects are bilateral in the same way.

The term resonance is often used metaphorically or even with a romantic connotation, in the sense of, for example, a kind of longing or an ethical ideal of striving for responsiveness and meaningful engagement with the world (see, for example, Rosa 2016). In contrast, the concept of affective resonance proposed here is politically and ethically rather ambivalent. Affective resonance is a micro-modality of power in social relations and affective arrangements because it is a dynamic of mutual modulation and influence. This means that in resonance, the power (*potentia*) of an individual, to speak with Spinoza, is increased or diminished, aided or restrained in a certain way.

The form of power that manifests itself in resonance, however, is weaker than a one-sided, instrumental or hierarchical conception of power, for example in the tradition of Max Weber. It has similarities with relational and productive understandings of power in, for example, the works of Michel Foucault and Judith Butler. The concept of resonance can help broaden the understanding of the emergence of subjectivities, which in the post-structuralist tradition is investigated as discursive subjectivation, to a domain of affective relational-

ity and affective subjectivation (Mühlhoff 2018). Resonance dynamics produce affective patterns and forms of relating that can virtually sediment in the affective disposition of individuals so that they are co-present in future resonance relations. In this way, the role of affect attunement for the constitution of subjectivity, of which Daniel Stern speaks in the context of developmental psychology, can be extended to a social philosophy of affective subject constitution based on affective resonance, as Guattari (1995) has suggested.

The power analytic relevance of a particular mode of subjectivation, which is based on resonance relations within affective arrangements, is evident, for example, in modern techniques of “Human Resource Management”. Certain working environments in the trend of the “new spirit of capitalism” (Boltanski & Chiapello 2007) use deliberately stimulated affective resonances to modulate their employees in a non-repressive way to ‘more productive’ forms of mutual interaction (Mühlhoff & Slaby 2018). While these new forms of collaboration – such as in startup culture and teamwork formations – are often subjectively rated as positive and empowering, the technologies of stimulation of appropriate affective bonds between co-workers can easily be analyzed as subtle form of coercion (Gregg 2011) and governance.

On the other hand, resonance can also contribute to the gradual and tacit emergence of empowering new forms of attachment and of intimate relatedness, e.g. in queer spaces and other subcultural movements. Often, spaces that are, to some extent, shielded from the dominant affective patterns in a society allow the emergence of such resonances which then, in turn, produce new social realities and life forms. This suggests that processes of empowerment and social transformation are not just based on deliberation and negotiation, not only on external antagonisms and conflicts, but also on internal and open processes that often start from local affective resonance dynamics. This spectrum of possible examples shows that affective resonance is not generally ‘good’ or ‘bad’, ‘desirable’ or ‘harmful’. The term neither articulates a political maxim nor an ethical ideal; it is rather a concept that facilitates the analysis of the micro-social power of mutual affective modulation.

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