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On the Evolutionary Effects of Social Suppression of Sexual Orientation – by an Agent-based Simulation for Human Life As-It-Could-Be –

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Studies on evolution of sexual dimorphism by sexual selection are including useful suggestions to understand not only the ecological diversity in nature (Turner and Burrows, 1995), but also the variation of sexual orientation in human society (Puts, 2010). Here we present a result of our multi-agent simulation concerning the effects of social (or cultural) suppression of sexual orientation on reproduction, sexual dimorphism and speciation. Each agent in the model has traits of its own appearance and preference for appearance of its partner (part of these traits are linked to the agent's biological sex), and roams around a 2D space to seek the most attractive candidate to propose a partnership to.

Studies on sexual orientation is a sensitive theme in wide fields such as psychology (Bailey et al., 2016), anthropology (Kirkpatrick, 2000), sociology, politics, and so on. It is often interpreted as a personal characteristic, but here we employ an alternative definition as a behavioral relation between two individuals that is a result of mutual attraction. Because Homo sapiens has sexual dimorphism to some degree, one may consider that androphilia and gynephilia are clearly distinguishable. However, such personalized conceptualization may also be a source of confusion that interferes systematic understanding about a variation of sexual orientation.

We modeled an individual by human-like life cycle, developed a simulator (Unemi and Matsumoto, 2018), conducted simulation processes of some thousands of agents and hundred thousands of steps, and analyzed the population dynamics. The model of individual agent consists of physical mobility, measurement of attractiveness, action selection on proposal and acceptance, aging, and death. Children are born from a female agent under a predefined probability if she has a male partner. The genome contains six two-dimensional vectors of appearances and preferences, some linked to the agent's biological sex and others not. The children inherit these traits from the parents with crossover and mutation.

To pursue the main theme of this research, we examined three different settings concerning who an agent chooses from when it tries to find a partner. The first one is to restrict it only to the opposite sex, and the second one is to allow to partner with anyone. The third one is to flip the suppression from *on* to *off* at the middle of each process.

Our statistical analysis provided two main observations. The first one is rather trivial; restricting partnerships to opposite sex resulted in a relatively higher reproduction rate. Meanwhile, the second observation is more intriguing from an evolutionary viewpoint; imposing no suppression on partnership selection promoted both sexual dimorphism and speciation. Under the no suppression condition, the phenotypic separation between sexes becomes more manifested as a result of sexual marker evolution for mating. It was also observed that the suppression gradually breaks the dimorphism. This suggests an ironical fact that the suppression promotes the wider diversity of sexual orientation in terms of who prefers who.

The current model lacks a lot of interesting features studied in evolutionary psychology (Buss, 2014). Introduction of the diploid and sex chromosome for genetics, resource possession and sharing for economics, and others will be possible extensions for our next stage.

References

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