

MATING STRATEGIES IN MOZART’S FIGARO

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ABSTRACT

*Since its first performance in 1786, Mozart’s opera *The Marriage of Figaro*, written in close cooperation with opera’s librettist Da Ponte, has inspired a wealth of research in musicology and cultural studies. We study the social relationships of this opera using an evolutionary framework. The protagonists are analysed with respect to biologically-relevant individual traits like gender, social status and reproductive value and via the dyadic ties of sexuality, kinship and friendship. We argue that *The Marriage of Figaro* displays the major human male and female mating strategies with regards to long and short-term relationships. The biological relevance of the dense social network may explain part of this opera’s popularity across centuries, together with its musical, dramaturgical, and overall aesthetical qualities.*

Keywords: *Sexual strategies, mating, performing arts, opera, social networks*

INTRODUCTION

Since its first performance in 1786, Mozart’s opera *The Marriage of Figaro*, written in close cooperation with the opera’s librettist Da Ponte, has inspired a wealth of research in musicology, cultural studies and a host of other disciplines (Kunze, 1984; Steptoe, 1988). The social and sexual politics of this opera, written at the eve of the French revolution, have

been described as quite radical for the time (Andrews, 2001). The main storyline criticises the behaviour of Count Almaviva, who lusts after his valet Figaro's fiancée Susanna. Susanna and the Count's wife then devise an eventually successful plan in order to save their respective marriages. The opera has retained its popular appeal among both critics and the audience throughout centuries and is currently listed as the 7th most often performed opera, and it is the second most performed opera of Mozart after *The Magic Flute* (Operabase, 2014).

Research on sexuality and gender in the performing arts has mostly used a historicist and social constructionist perspective, paying attention to how representations of gender, and of social and sexual inequalities reproduce culturally constructed norms (e.g., Shepher & Reisman, 1985; Smart, 2000). For instance, Ford (1991, 2012) discusses the ways in which the relations between women are characterised by traditionally feminine jealousies and gossip, while (Andrews, 2001) argues that the libretto is pro-feminist in its understanding and approval of the main female protagonists.

Yet, although much has been written on how performance art portrays Darwinian evolution (Goodall, 2002; Shepherd-Barr, 2008), there is relatively little analysis of performing arts in an evolutionary framework, with the notable exception of Nettle (2005) and Cooke and colleagues (Cooke & Turner, 1999) who link opera (Cooke, 2010a, 2010b, 2014) and ballet (Cooke, 1995) to the evolutionary origin of the human traits underpinning social behaviour and reproductive strategies. The study of performing arts is being transformed in a similar way to the much larger and more established field of evolutionary literary studies, where evolutionary theory has been applied to analyse both the content of narratives and the origin of narratives themselves (Abbott, 2000; Carney, 2014; Carney, Dunbar, Machin, Dávid-Barrett, & Silva, 2014; Carroll, 2006; Gottschall, 2008; Kruger, Fisher, & Jobling, 2003).

Here, we aim to contribute to evolutionary study of performing arts by analysing the set of mating strategies displayed in Mozart's *The Marriage of Figaro*. We suggest that the fact that this opera includes such a range of evolutionarily relevant mating strategies within one social network might have contributed to its remarkable emotional resonance, similar to (Cooke, forthcoming). This is not offered as an all-encompassing explanation for why the opera is important as a cultural artefact. Figaro is a work of remarkable nuance and artistry, and no single approach—evolutionary or otherwise—is likely to do it justice.

DIVERSITY OF EVOLVED MATING STRATEGIES IN HUMANS

Humans have long-term pairbonds formed through mutual choice. Both men and women try to obtain and maintain the best long-term sexual partner they can get, relative to their respective mate market value. Long-term partners are valued for loyalty, compatibility, social status, and parenting skills. In all known human societies, the vast majority of children are conceived and raised within such long-term unions (Buss & Schmitt, 1993; Lewis, Easton, Goetz, & Buss, 2012). These long-term pairbonds exist within the larger kin group of both

partners and multi-male multi-female wider social community. Thus both kin and non-kin may have an interest in the pairbond, as they can be at the same time potential sexual rivals and community members who contribute to and compete for the same resources (Gangestad & Simpson, 2000; Pillsworth & Haselton, 2003).

Additionally, both males and females may pursue other sexual partners outside the primary long-term relationship. Short and long-term matings represent different mammalian attraction systems, the former being based on sexual attraction and the latter on romantic attraction and companionate attachment (often—but not always—with sexual attraction as an initial stage of the relationship) (Fisher, Aron, & Brown, 2006). The distinction is not absolute since, for instance, one or both of the partners may enter a short-term relation with the intention of making it last, which would be one of the evolutionary reasons for short-term mating.

Here, we focus on the main and temporal dimension of human mating strategies - namely on monogamous (or long-term and exclusive) pair bonds and the threat posed to them by shorter-term pair bonds. This tension is central to both the plot of *Figaro* and actual human behaviour. Short-term strategies are sometimes further separated into short-term matings and extra-pair matings, depending on whether one or both of the partners already have a long-term mate (Buss, 2007).

Mating strategies can also be directed at manipulating existing or potential competitors and mates. Such strategies include intrasexual competition, mate manipulation, mate poaching (or trying to get access to an already mated individual), and mate guarding (or preventing others from gaining access to your mate) (Fisher & Cox, 2011; Haselton, Buss, Oubaid, & Angleitner, 2005).

To implement mating strategies, individuals use specific tactics (e.g., physical threat, resource display, or enhanced visual appearance (Fisher & Cox, 2011; Jonason & Buss, 2012). While intrasexual competition is prominent in securing mates ((Jennions & Kokko, 2010); for humans see (Fink, Klappauf, Brewer, & Shackelford, 2014)), individuals may also create intrasexual alliances (e.g. females cooperate in order to reduce male access to short-term matings).

The evolutionary rationale for short-term relations is to increase either the quantity or quality of offspring born (Low, 2000). Fitness benefits of different mating strategies vary by sex. The physiological costs of reproduction are higher for women, who also typically invest more in child-care compared to men (Bribiescas, Ellison, & Gray, 2012; Trivers, 1972). This increases the risks and fitness costs of short-term mating for women, as well as the importance of receiving external resources, whether through long or short-term mating, for successful reproduction (Buss, 1994). Additionally, internal fertilisation in humans opens the possibility for paternity uncertainty, increasing the costs of long-term mating in men in case they raise children who they are not genetically related to. This is assumed to increase the need for sexual mate guarding among men (Birkhead, 2000).

In long-term relations, both sex value commitment, reliability, and parenting skills (Moller & Thornhill, 1998) are valued. By contrast, there is a marked sex difference in short-

term mate choice (Schmitt, 2005; Schmitt et al., 2012). Securing resources, good parenting and good genes for the offspring is crucial for both sexes. However, only women have had the option of separating between these parental functions in their sexual partners, i.e. good genes can be provided by one male and resources by another. Men, by contrast, are predicted to devote a larger proportion of their overall mating effort to short-term matings (Buss & Schmitt, 1993), and to especially value cues of fertility in females. Females are predicted to be comparatively less disposed to engage in short-term relations, and to do so especially with individuals who represent high gene quality or resources (Pillsworth & Haselton, 2003; Schmitt, 2005).

Individuals also tend to choose mates who are not too different in their rank on the mating market. This leads to assortative mating, so that 'like ends up with like' in long-term relationship (Štěrbová & Valentová, 2012; Thiessen & Gregg, 1980).

Sex differences in mating strategies are also predicted to vary by ecological situation including mode of production (Marlowe, 2000), resource abundance (Low, 2005), and local sex ratios (Jennions & Kokko, 2010). For instance, a low sex ratio with few eligible men compared to women may increase female likelihood to have short-term matings (South & Trent, 1988), while high importance of paternal investment for children may reduce men's fitness benefits from multiple matings (Pettay, Rotkirch, Courtiol, Jokela, & Lummaa, 2014).

Among primates, humans exhibit a complex set of possible temporal mating strategies all taking place within a larger social group (e.g., Geary & Flinn, 2001). Most men and women enter at least one long-term mating during their life, and the great majority of children are born in such unions (Anderson, 2006). Simultaneously, both sexes may accrue additional benefits from pursuing short-term relationships (Gangestad & Simpson, 2000; Pillsworth & Haselton, 2003).

Here, we will analyse the repertoire of mating strategies present in Mozart's opera, *The Marriage of Figaro*. To achieve this goal, we analyse the reproductive problem and consequent solution of each of the protagonists of the opera, within the evolutionary mate-choice framework as first outlined by Buss & Schmitt (Buss & Schmitt, 1993). The 'point of view' of each protagonist is considered, evolutionarily speaking, in terms of the decision taken within the available mating strategies that would maximize his or her differential reproductive success given local restrictions, such as age, mate value and social status. We consider both actualized mating strategies, such as actual marriage, but also possible or desired mating strategy, such as an attempt to have an affair. Our analysis is primarily descriptive in nature. However, we do approach this opera with a set of assumptions: (i) for both sexes, the goal is to have a reliable long-term spouse committed to parental investment, and to mate guard the resources and fidelity of this spouse; (ii) for men there is a further, secondary aim, namely the access to fertile females; (iii) for women, secondary aims are securing resource access and good genes as separate from paternal investment (if the long-term partner lacks genetic quality in comparison to the other possible mates around). Additionally, (iv) if a man or woman lives in an infertile union, both are expected to seek

access to other, potentially fertile partners. Any other analysis considering a different set of assumptions has the potential to yield different results. This study is thus restricted to the content of plot as outlined in the libretto; for an analysis of the musical implementation of the main relationships see Ford (1991) and Will (2007). Note that throughout the paper we are using the 1888 translation by the Oliver Ditson Company.

NON-SEXUAL RELATIONSHIPS

Table 1 displays the social connections in this opera. No characters have dependent children, but parenting (and potential grandparenting) is present in the form of Marcellina, who turns out to be Figaro's mother. Kinship is present as Barbarina has a father and is Susanna's cousin. Fictive kin are also present in the form of Cherubino, as he is the Count's and Countess's god-son. The two main female characters (Countess and Susanna) represent female friendship, while the Count and Basilio represent male friendship, albeit in this oeuvre their relation has possibly sexual significance. Most of the action, as expected, centres around the first stages of mating, such as flirting.

MATING STRATEGIES

Long-term mating (Count and Countess, Susanna and Figaro) is contrasted with possible short-term matings (Count and Susanna, Figaro and Barbarina, Cherubino and Susanna). Interestingly, in this opera, no one actually consummates any of these possible new affairs. On the margin of the main plot, two other long-term pair bonds appear: the possible marriage of Figaro and Marcellina, as well as a possibly short-term mating in the past (Marcellina and Bartolo), which towards the end of the opera turns into a promise of long-term pair bond.

The characters include different social strata, from the high status male (Count Almaviva) and female (Countess) to the low status male (Figaro) and females (Susanna, Barbarina). Marcellina and Bartolo are mid-status, while Cherubino is of uncertain social rank. Furthermore, the characters differ in terms of their desirability as mate, i.e., in their mate value other than social status (e.g., age, attractiveness, etc.).

Below, we detail the social situation and pair choice problems the main protagonists face. The process of analysis first relied on listing all the characters, followed by the mapping of the ego network of each agent. This allowed us to draw up a separate set of mating strategies associated with each character, and the analysis of the strategies chosen, and the supporting tactics employed by each character.

The Count's problem:

The count is the dominant male at the height of his power. He controls most of the resources of this small group. As a high status male, his best evolutionary strategy is to form a long-term pair bond with a high-quality female, and then increase his fitness via short-term mating with other women, offering physical and network resources. (It is important to note here that, of course, the mating strategy set, the process of choosing an actual strategy from this set, and employment of the corresponding tactics is not necessarily conscious, and thus the decisions made are often driven by emotions rather than being rationally chosen.) In line with this prediction, the Count is paired with the Countess. The couple is beyond the initial phase of romantic infatuation expected at the beginning of the pair bond. For instance, the Countess singing: *"They are over, the happy moments! I must henceforth sigh in vain; is there left me no charm to lure him to these loving arms again?"* Despite having lived together for some years as a married couple, the Count and the Countess have no children, which signals either potential infertility on the part of at least one of them, or genetic incompatibility of the partners.

The Count attempts to engage in short-term mating with Susanna before her marriage to Figaro. (Susanna: *"It seems his lordship, weary of roaming forth in search for beauty, has come to this conclusion: it were better to seek it at home, in his castle. His wife is out of question; only guess then who has caught his fancy?"* Figaro: *"It passes guessing."* Susanna: *"Why, your own Susannetta."* Figaro: *"Not you?"* Susanna: *"Yes, I, so please you. Do you believe now that his lordship gives my dowry merely to pay your service!"*) The resources offered in exchanged are only rarely alluded to, as this might alienate her with its connotations of prostitution, and thus damage her reputational position within the small and tightly-knit social world that she inhabits. (The Count to Susanna: *"say you'll meet me, my dearest, when day is o'er, within the orange bower, and your kindness shan't go without reward".*) The Count is trying to gain acceptance for and institutionalise his access to Susanna. It is implied, but not directly spelled out that the Count also has access to Barbarina.

All protagonists who have a spouse face the problem of mate guarding, i.e., preventing their partner from engaging in short-term mating with others. As expected, the Count (representing high resources) is, in this regard, in intra-sexual competition with Cherubino (representing high gene quality) both regarding his primary partner, the Countess, and his desired secondary partner, Susanna. Note that the mate guarding effort (represented here by the toughness of the Count on the potential competitor Cherubino) is much higher when guarding the primary, high resource and actual long-term partner (the Countess) than the secondary, lower resource potential short-term partner (Susanna). (Basilio observes about Cherubino: *"Apropos of the Page, now; he is much too incautious. Often at table his looks betray his passion—understand, for the Countess. Should his lordship observe it—he's suspicious—you know him—he'd play the devil."*) The Count essentially sentences Cherubino to likely death by sending him on military service in an enactment of competitor manipulation.

In sum, the Count is childless, and hence his problem is to generate paternity (or if he has had some children from previous liaisons, expand his paternity) via extramarital liaisons with Susanna (who is mate guarded by Figaro) and Barbarina. The Count is mate guarding against Cherubino, whom Susanna, and in some interpretations, the Countess find attractive, and who thus represents the Count's risk of being cuckolded.

The Countess's Problem:

The Countess is a high status female with supposedly high gene quality (her beauty is mentioned several times) and maternal capacities, but who might be potentially infertile as she is currently childless. She is paired to a high resource male, from whom she would expect two forms of resources: physical resources (Low, 2000) proxied in this case by gifts, and future paternal investment towards a potential offspring (Thornhill & Gangestad, 2008) proxied in this case by emotional tenderness. Sexual infidelity is not necessarily threatening, unless it leads to a new romantic attachment, which then threatens the supply of resources and care. The Countess is lacking in at least the second from her husband, potentially due to infertility in the first years of marriage. (Countess to the Count: “*don't call me Rosina: That name is the token of vows that are broken, of love and affection that long since are dead. Ah, cruel! I once was perfection; but those days are fled!*”) Her objective is to revive the tie with him, and hence secure his commitment to her and her potential children. (Countess: “*Love, though holy purest impulse, o! restore me his heart again, bring him back or let me perish*”). At the same time, she should be guarding the physical resources going from her husband to other women (with whom he has or intends to have short-term mating). Hence she is engaged in a plot that would prevent her husband from having an affair with Susanna (a case of strategic interference), while simultaneously rekindling the emotional commitment to her.

The Countess would also be expected to try to increase her chances of conception via short-term matings with the attractive male, Cherubino (Jones et al., 2001; Penton-Voak et al., 2001). The Countess's desire for Cherubino is implied in the scene in which Susanna and the Countess dress Cherubino, while not explicit in the libretto. This allowed some interpretations of this opera to portray the Countess as not sexually interested in Cherubino, but rather being the image of marital purity. Interestingly, in the plot's later development, in the next play in the series by Beaumarchais, written after Mozart's and da Ponte's opera, the Countess gives birth to a child fathered by Cherubino, in the give-away-titled play, *The Guilty Mother* (Beaumarchais & Maradan, 1793).

Susanna's problem:

Susanna is happy to marry Figaro from whom she expects resources (physical and parental). However, her situation within the household means she could gain additional resources by a liaison with the Count. In a way her best option would be to pursue a double strategy where she creates a lasting bond with Figaro, while obtaining resources from the Count. However, this can only happen at high costs to her reputation, potentially damaging her relationship with the Countess, and perhaps her position in the household altogether. She could also

gain “good genes” from Cherubino, who is described as seductively attractive compared to the plain Figaro. Susanna’s problem of choosing a secondary mate between the high status and resource rich Count, and the high gene quality Cherubino is aptly summed up by the following passage. Basilio: “I took for granted that you’d your sex’s likings and impressions, and would prefer for lover one of birth, in the prime of life and manhood, to beardless pages and striplings.” Susanna: “To Cherubino?” Basilio: “Yes, Cherubino—cherubim of goodness—who was observed this morning slily lurking in the passage to this room.”

Susanna’s strategy is to opt for female solidarity with the Countess, perhaps within a female best friend framework (David-Barrett et al., 2015), despite lying to the Countess’s direct question. (Countess: “He sought, then, to seduce you?” Susanna: “Oh, no; his lordship would ne’er confer such favors on the lowly and simple”.) They form a female-bonded strategy intended to protect their respective marriages, while they also maintain their enjoyment in fooling around with Cherubino, dressing him up as a girl, and flirting with him.

By contrast, Susanna is in sharp competition with Marcellina concerning who will marry Figaro. Their duetto wonderfully illustrates what Ford (1991, 165-16) called “the women’s understanding of the closely woven web of sexual scandal, jealousies, those *dubbi et sospetti* (doubts and suspicions)”. (See below for more on her relationship with Marcellina). Notably, Susanna also reminds Figaro that he needs to mate guard her. Via inviting his attention to a potential threat to his paternity, she strategically builds up her credibility with him as her primary partner. This both can strengthen their union, and could reduce the long-term mate guarding efforts by him. Thus, Susanna’s behaviour can be regarded as a tactic to reduce the cost of the possible extra-pair relationships further in future.

Figaro’s problem:

As the title of the opera declares, Figaro’s main aim is to marry Susanna, i.e., to build a long-term pairbond with her. However, recognising the paternity threat coming from the Count and Cherubino, he has to mate guard his bride. Figaro alters the institutional constraints by thwarting the Count’s plans about both moving to London and engaging in *prima nocta*. The interactions between Figaro and the Count depict the relevance of male hierarchies in reproductive conflict. The threat from Cherubino is eliminated by the Count’s order that Cherubino leaves for the military.

Figaro also has sexual possibilities with respect to Barbarina (short-term) and Marcellina (long-term).

Finally, we note that, in principle, Figaro could have an extramarital affair with the Countess. However, despite her questionable fertility status he is not in her league (she has access to better both in terms of resources and genes) and the costs to Figaro of such an affair would be enormous in terms of potentially loosing his position in the household, and hence access to resources.

Cherubino's problem:

Arguably, Cherubino is of high gene quality (an entire aria of Susanna is devoted to his good looks, and popularity among women), but the threat this poses towards other males risks him being expelled from the court. Nevertheless, he clearly willing to engage with whoever desires him. (In fact, the very introduction of Cherubino as a character starts with his announcement of his desire for three women at once. Cherubino: *"His lordship found me alone this morning with our Barbarina, and dismissed me his service. Unless the gracious Countess, my beloved protectress, grants me her intercession, I'm lost for ever, and ne'er again shall see my own Susanna."* Susanna: *"You will see me no more? Bravo! then no more you burn, sir, for the Countess? You breathe no longer your sighs for her in secret?"*).

Marcellina's problem:

Marcellina is at the end of her fertile years and a woman of mid-level social status. It is probably her last chance to conceive, which is concomitant with a different trade-off in mate choice than for more fertile women: she needs to act now, and she decides to trade off her current financial resources in order to get married to a young man, Figaro, and thus secure his future paternal investment. However, she faces a classic problem: she is providing the resources now, while the payback needs to take place in the future. Figaro has all the incentives to promise his future contributions in exchange of the money now, but once he receives the resources, there is no interest for him to keep his word. This is known as intertemporal incentive incompatibility in economics (Millner, & Heal, 2014), with the standard solution being a legal institution that bridges the different time periods of commitment. And, in effect, this exactly what Marcellina employs when she calls up the law to force Figaro to deliver his promise.

The consequence of Marcellina's reproductive goals is intrasexual competition with Susanna, who also wishes to marry Figaro and whom Figaro loves.

Thus, Marcellina uses a two-pronged approach to secure Figaro as a husband: on the one hand she uses a legal institution (forcing Figaro to fulfil his promise in the debt letter), and on the other she attempts to reduce the perceived mate value of her competitor, which is an excellent example for both mate and competitor manipulation. (Marcellina: *"I have broken a marriage much more advanced than this is; for slander often, if well aimed, can work wonders. Know, this contract is not all—basta! Let's first get the bride into disgrace. Were she but once persuaded to scorn Almaviva's love-approaches, he then, from disappointment, would assist me, I'm certain, and Figaro compel to be my husband."*)

The duet of Marcellina and Susanna is a wonderful example of a musical representation of female intrasexual competition. The two sides hurl fake compliments to each other (Marcellina refers to Susanna's beauty, while Susanna refers to Marcellina's honourableness), which then deteriorate into slander and insults (Marcellina refers to Susanna being the Count's "favourite", while Susanna implies that Marcellina is the "favourite" of the entire city), with Susanna pointing at Marcellina's age (listed as a fake reason for her to be polite towards Marcellina). Notice that all these references (high gene

quality, social status, promiscuity, and age) are crucial mate choice factors that can be used in intrasexual competition (Berglund, Bisazza, & Pilastro, 1996). Interestingly, right when Susanna pronounces the words “age” (“l’eta”), the musical accompaniment suddenly changes, underlying that this is in fact an insult. We observe that the sound of the orchestra at this point could be associated with the sounds of feline physical altercation, and perhaps liking this effect is why Mozart (very unusually in his entire oeuvre) repeated this musical segment without change within the same duet.

At the end of the opera it turns out that Marcellina and Bartolo are the parents of Figaro. Interestingly, the horror that even the thought of marrying one's own mother or son would raise in most humans (Westermarck, 1891) is not represented in this opera, where the turn is given short attention, and only a comic side. When the truth is discovered, Marcellina immediately switches to the role of a mother, a mother-in-law, and a future grandmother (allo-parenting has an important effect in offspring health and survival, see Hrdy (2009)). She then starts mate-guarding Susanna in the name of Figaro, her son, a case of parental influence on offspring mating strategy (Apostolou, 2013). She also renews her emotional ties to Bartolo in what would also serve to support their child Figaro and his family.

Bartolo's problem:

In the past, Bartolo, a mid-status male, has competed with the Count (for the hand of the Countess), a memory which is projected on Figaro (who was then aiding the Count). Once it is revealed that Figaro is his and Marcellina's son, he takes the role of the elderly spouse and the future grandfather. Similar to the case of Marcellina, this switch in social role and priorities can be explained by reproductive interests, i.e. long-term investment in the grandchildren.

Barbarina's problem:

Barbarina is not of high social status and is not described as being high genetic quality, but she is a young fertile female. It is implied that she flirts with everyone. She is only guarded (lightly) by her father Antonio, about whom it is insinuated that he is unconcerned about her virtue. Barbarina's low prospects to secure a high-quality mate might explain her father's lax views on her virtue.

The problem of Basilio:

Basilio is a male of mid status and resource, dependent on the Count. In many current interpretations he is also gay, and sexually desires the Count. If the latter interpretation is valid, it completes the repertoire of evolutionarily selected sexual strategies (Camperio-Ciani, Corna, & Capiluppi, 2004).

Table 1. Mate-market factors and strategies of the characters

	Status	Resources	Age	Reproductive value	Mating status when introduced	Objective function	Kin and friendship
Male: Count	High	Rich		High	Paired with Countess	EPC (Susanna, Barbarina) Mate guarding (Countess)	
Female: Countess	High	Rich	Pre MP	Mid	Paired with Count	Q _{max} (Cherubino) Resource guarding (Count)	Friend with Susanna
Female: Susanna	Low	Poor	Young	High	Paired with Figaro	Paternal investment (Figaro) Resource maximisation, but coercion control (count) Q _{max} (Cherubino)	Friend with Countess Cousin of Barbarina Niece of Antonio
Male: Figaro	Low	Poor	Mid	Mid	Paired with Susanna	Mate guarding (Susanna) EPC (Barbarina)	Later: son of Marcellina and Bartolo
Male: Cherubino	Low	Poor	Young	Unclear	'free' agent	EPC partner without detection (Countess, Susanna, Barbarina)	
Female: Marcellina	Mid	Rich	Peri MP	Low	Marriage contract with Figaro	Intragender competition (with Susanna) for Figaro at the beginning Later: Susanna's mother in law: aiding Figaro in mate guarding	Later: mother of Figaro
Male: Bartolo	Mid	Mid	Old	Mid	'friend' of Marcellina/ unsuccessful suitor of the Countess (earlier)	Reference to previous competition with the Count Later: supporting Marcellina	Later: father of Figaro
Male: Basilio				?Mid?	Not clear	In some interpretations	Close ally of the Count
Male: Don Curzio							Remote ally of the Count
Female: Barbarina	Low	Poor	Young	High	Short-term mating		Cousin of Susanna Daughter of Antonio
Male: Antonio	Low	Poor	Old				Father of Barbarina Uncle of Susanna

CONCLUSIONS

The Marriage of Figaro is not only one of Mozart's most revered operas, but also often cited as a work of pure genius (Cairns, 2007). Indeed Mozart's *Figaro* counts among the great operas of all time, allowing "human reality to be transparent to a degree not matched before or after" (Kunze 1984, 224). It is often assumed that this comes from the musical qualities of the opera, which are indubitably exceptional (Ford, 1991; Will, 2007). We have described the actual and potential sexual strategies of the plot. Interestingly, within a small circle of protagonists all the major evolutionarily relevant mating strategies related to long- and short-term mating are present.

As previously stated, we do not presume that this reading exhausts the full import of *Figaro*. We have focused exclusively on the action of the piece, and said nothing about the music, staging, mise-èn-scène, intertextual references and historical context that comprise so much of what makes *Figaro* such a compelling work of art. Nevertheless, we do argue that considerations of these issues will be improved by a reflection on the evolutionary import of the plot. For instance, take the genre of *Figaro*, the *opera buffa*. The comedic orientation of this genre is a matter of record; what is less well understood is why its subject matter—human relationships—should be considered funny. An evolutionary reading helps us here. By foregrounding, as Mozart does, the mate choice problems faced by different protagonists, he creates a series of comic inversions and deflations (for instance, when the grasping Marcellina reacts to narrowly avoided incest with her son with the same *sang froid* that might attach to a business deal gone wrong). The examples could be multiplied, but the general point should be clear: Mozart and da Ponte used the raw material of human mating to communicate their artistic, polemical, and psychological points.

In sum, then, we suggest that part of the enduring success of *The Marriage of Figaro* is explained by Mozart bringing together an evolutionarily significant plot with the emotional salience of prodigious musical accomplishment. In the future, we hope to extend this analysis further by looking at the wider network complexity of the piece, especially with reference to the likely limits on the audience's capacity for processing social relations depicted in *The Marriage of Figaro*.

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REFERENCES

- Abbott, H. P. (2000). The evolutionary origins of the storied mind: Modeling the prehistory of narrative consciousness and its discontents. *Narrative*, 8(3), 247-256.
- Anderson, K. G. (2006). How well does paternity confidence match actual paternity? Evidence from worldwide nonpaternity rates. *Current Anthropology*, 47(3), 513-520. doi: 10.1086/504167
- Andrews, R. (2001). From Beaumarchais to Da Ponte: A new view of the sexual politics of 'Figaro'. *Music & Letters*, 82(2), 214-233.
- Apostolou, M. (2013). Do as We Wish: Parental Tactics of Mate Choice Manipulation. *Evolutionary Psychology*, 11(4), 795-813.
- Beaumarchais, P. A. C. d., & Maradan, C.-F. (1793). *L'autre Tartuffe, ou, La mère coupable : drame moral en cinq actes*. Paris: Maradan.
- Berglund, A., Bisazza, A., & Pilastro, A. (1996). Armaments and ornaments: An evolutionary explanation of traits of dual utility. *Biological Journal of the Linnean Society*, 58(4), 385-399. doi: 10.1111/J.1095-8312.1996.Tb01442.X
- Birkhead, T. R. (2000). *Promiscuity : an evolutionary history of sperm competition and sexual conflict*. London: Faber and Faber.
- Bribiescas, R. G., Ellison, P. T., & Gray, P. B. (2012). Male Life History, Reproductive Effort, and the Evolution of the Genus Homo New Directions and Perspectives. *Current Anthropology*, 53, S424-S435. doi: 10.1086/667538
- Buss, D. M. (1994). *The evolution of desire : strategies of human mating*. New York: BasicBooks.
- Buss, D. M. (2007). The evolution of human mating. *Acta Psychologica Sinica*, 502–512.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual Strategies Theory - an Evolutionary Perspective on Human Mating. *Psychological Review*, 100(2), 204-232. doi: 10.1037/0033-295x.100.2.204
- Cairns, D. (2007). *Mozart and his operas*. London: Penguin.
- Camperio-Ciani, A., Corna, F., & Capiluppi, C. (2004). Evidence for maternally inherited factors favouring male homosexuality and promoting female fecundity. *Proceedings of the Royal Society B-Biological Sciences*, 271(1554), 2217-2221. doi: 10.1098/Rspb.2004.2872
- Carney, J. (2014). Supernatural Intuitions and Classic Detective Fiction: A Cognitivist Appraisal. *Style*, 48(3), 203–218.
- Carney, J., Dunbar, R. I. M., Machin, A., Dávid-Barrett, T., & Silva, M. J. (2014). Social Psychology and the Comic-Book Superhero: A Darwinian Approach. *Philosophy and Literature*, 38(1A), A195-A215.
- Carroll, J. (2006). The Human Revolution and the Adaptive Function of Literature. *Philosophy and Literature*, 30(1), 33-49.
- Cooke, B. (1995). Microplots - the Case of Swan Lake. *Human Nature-an Interdisciplinary Biosocial Perspective*, 6(2), 183-196. doi: 10.1007/Bf02734178

- Cooke, B. (2010a). Clichés Worth Singing: Narrative Commonplaces in Opera. *The Evolutionary Review*, 1, 76-81.
- Cooke, B. (2010b). Musical Truth in Musorgsky's Boris Godunov. *Politics and Culture*.
- Cooke, B. (2014). Elevation in Janáček's Jenůfa. *Music and Society in Eastern Europe and Russia*, 9, 38-53.
- Cooke, B. (forthcoming). Instinctual Humanity and Rational Humanism in Mozart's Le nozze di Figaro. In K. Stasio & M. Austin (Eds.), *Reasoning Beasts: Evolution, Cognition, and Culture, 1720-1820*. New York: AMS Press.
- Cooke, B., & Turner, F. (1999). *Biopoetics : evolutionary explorations in the arts*. Lexington, Ky.: ICUS.
- David-Barrett, T., Rotkirch, A., Carney, J., Behncke Izquierdo, I., Krems, J. A., Townley, D., . . . Dunbar, R. I. (2015). Women favour dyadic relationships, but men prefer clubs: cross-cultural evidence from social networking. *PLoS One*, 10(3), e0118329. doi: 10.1371/journal.pone.0118329
- Fink, B., Klappauf, D., Brewer, G., & Shackelford, T. K. (2014). Female physical characteristics and intra-sexual competition in women. *Personality and Individual Differences*, 58, 138-141. doi: 10.1016/J.Paid.2013.10.015
- Fisher, H. E., Aron, A., & Brown, L. L. (2006). Romantic love: a mammalian brain system for mate choice. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 361(1476), 2173-2186. doi: 10.1098/Rstb.2006.1938
- Fisher, M., & Cox, A. (2011). Four strategies used during intrasexual competition for mates. *Personal Relationships*, 18(1), 20-38. doi: 10.1111/J.1475-6811.2010.01307.X
- Ford, C. (1991). *Così? : sexual politics in Mozart's operas*. Manchester: Manchester University Press.
- Ford, C. (2012). *Music, sexuality and the Enlightenment in Mozart's Figaro, Don Giovanni and Così fan tutte*. Farnham: Ashgate.
- Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences*, 23(4), 573-+. doi: 10.1017/S0140525x0000337x
- Geary, D. C., & Flinn, M. V. (2001). Evolution of human parental behavior and the human family. *Parenting-Science and Practice*, 1(1-2), 5-61. doi: 10.1080/15295192.2001.9681209
- Goodall, J. R. (2002). *Performance and evolution in the age of Darwin : out of the natural order*. London: Routledge.
- Gottschall, J. (2008). Romantic Love: A literary universal? *Literature, Science, and a New Humanities*, 157-170. doi: 10.1057/9780230615595
- Haselton, M. G., Buss, D. M., Oubaid, V., & Angleitner, A. (2005). Sex, lies, and strategic interference: The psychology of deception between the sexes. *Personality and Social Psychology Bulletin*, 31(1), 3-23.

- Hrdy, S. B. (2009). *Mothers and others : the evolutionary origins of mutual understanding*. Cambridge, Mass. ; London: Belknap Press of Harvard University Press.
- Jennions, M. D., & Kokko, H. (2010). Sexual Selection. In C. W. Westneat & D. Fox (Eds.), *Evolutionary behavioral ecology* (pp. 343–364). Oxford: Oxford University Press.
- Jonason, P. K., & Buss, D. M. (2012). Avoiding entangling commitments: Tactics for implementing a short-term mating strategy. *Personality and Individual Differences, 52*(5), 606-610. doi: 10.1016/J.Paid.2011.12.015
- Jones, B. C., Little, A. C., Penton-Voak, I. S., Tiddeman, B. P., Burt, D. M., & Perrett, D. I. (2001). Facial symmetry and judgements of apparent health - Support for a "good genes" explanation of the attractiveness-symmetry relationship. *Evolution and Human Behavior, 22*(6), 417-429. doi: 10.1016/S1090-5138(01)00083-6
- Kruger, D. J., Fisher, M., & Jobling, I. (2003). Proper and dark heroes as dads and cads - Alternative mating strategies in British romantic literature. *Human Nature-an Interdisciplinary Biosocial Perspective, 14*(3), 305-317. doi: 10.1007/S12110-003-1008-Y
- Kunze, S. (1984). *Mozarts Opern*. Stuttgart: Reclam.
- Lewis, D. M. G., Easton, J. A., Goetz, C. D., & Buss, D. M. (2012). Exploitative male mating strategies: Personality, mating orientation, and relationship status. *Personality and Individual Differences, 52*(2), 139-143. doi: 10.1016/J.Paid.2011.09.017
- Low, B. S. (2000). Sex, wealth, and fertility: Old rules, new environments *Adaptation and human behavior: An anthropological perspective* (pp. 323-344).
- Low, B. S. (2000). *Why sex matters : A Darwinian Look at Human Behavior*. Princeton, N.J.; Oxford: Princeton University Press.
- Low, B. S. (2005). Women's lives there, here, then, now: a review of women's ecological and demographic constraints cross-culturally. *Evolution and Human Behavior, 26*(1), 64-87. doi: 10.1016/J.Evolhumbehav.23004.08.011
- Marlowe, F. W. (2000). Paternal investment and the human mating system. *Behavioural Processes, 51*(1-3), 45-61. doi: 10.1016/S0376-6357(00)00118-2
- Millner, A., & Heal, G. (2014). Resolving intertemporal conflicts: economics vs politics (No. w20705). *National Bureau of Economic Research*. <http://dx.doi.org/10.3386/w20705>
- Moller, A. P., & Thornhill, R. (1998). Male parental care, differential parental investment by females and sexual selection. *Animal Behaviour, 55*, 1507-1515. doi: 10.1006/Anbe.1998.0731
- Nettle, D. (2005). What Happens in Hamlet? The Psychological Foundations of Drama. In J. Gottschall & D. S. Wilson (Eds.), *The Literary Animal: Evolution and the Nature of Narrative* (pp. 56-75). Evanston IL: Northwestern UP.
- Operabase. (2014). Statistics 2014/15. Retrieved accessed 20.11.2014, from <http://www.operabase.com>
- Penton-Voak, I. S., Jones, B. C., Little, A. C., Baker, S., Tiddeman, B., Burt, D. M., & Perrett, D. I. (2001). Symmetry, sexual dimorphism in facial proportions and male facial attractiveness.

- Proceedings of the Royal Society B-Biological Sciences*, 268(1476), 1617-1623. doi: 10.1098/Rspb.2001.1703
- Pettay, J. E., Rotkirch, A., Courtiol, A., Jokela, M., & Lummaa, V. (2014). Effects of remarriage after widowhood on long-term fitness in a monogamous historical human population. *Behavioral Ecology and Sociobiology*, 68(1), 135-143. doi: 10.1007/S00265-013-1630-6
- Pillsworth, E. G., & Haselton, M. G. (2003). Women's sexual strategies: The evolution of long-term bonds and extrapair sex. *Annual Review of Sex Research*, 17, 59–101.
- Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences*, 28(2), 247+. doi: 10.1017/S0140525x05000051
- Schmitt, D. P., Jonason, P. K., Byerley, G. J., Flores, S. D., Illbeck, B. E., O'Leary, K. N., & Qudrat, A. (2012). A reexamination of sex differences in sexuality: New studies reveal old truths. *Current Directions in Psychological Science*, 21(2), 135-139. doi: 10.1177/0963721412436808
- Shepher, J., & Reisman, J. (1985). Pornography - a sociobiological attempt at understanding. *Ethology and Sociobiology*, 6(2), 103-114. doi: 10.1016/0162-3095(85)90003-2
- Shepherd-Barr, K. (2008). Darwin on stage: evolutionary theory in the theatre. *Interdisciplinary Science Reviews*, 33(2), 107-115. doi: 10.1179/030801808x259763
- Smart, M. A. (2000). *Siren songs : representations of gender and sexuality in opera*. Princeton, N.J.; Oxford: Princeton University Press.
- South, S. J., & Trent, K. (1988). Sex-ratios and womens roles - A cross-national analysis. *American Journal of Sociology*, 93(5), 1096-1115. doi: 10.1086/228865
- Stephoe, A. (1988). *The Mozart-Da Ponte operas : the cultural and musical background to Le nozze di Figaro, Don Giovanni, and Così fan tutte*. Oxford: Clarendon Press.
- Štěrbová, Z., & Valentová, J. (2012). Influence of homogamy, complementarity, and sexual imprinting on mate choice. *Anthropologie*, 47–59.
- Thiessen, D., & Gregg, B. (1980). Human assortative mating and genetic equilibrium - An evolutionary perspective. *Ethology and Sociobiology*, 1(2), 111-140. doi: 10.1016/0162-3095(80)90003-5
- Thornhill, R., & Gangestad, S. W. (2008). *The evolutionary biology of human female sexuality*. Oxford ; New York: Oxford University Press.
- Trivers, R. L. (1972). Parental Investment and Sexual Selection. In B. Campbell (Ed.), *Sexual Selection and the Descent of Man, 1871-1971* (pp. 136-179). Chicago: Aldine.
- Westermarck, E. (1891). *The history of human marriage*. London,: Macmillan.
- Will, R. (2007). The ambivalence of Mozart's countess. In J. P. Cassaro (Ed.), *Music, Libraries, and the Academy: Essays in Honor of Lenore Coral* (pp. 31-53). Middleton: A-R Editions.