Life Course Similarities on Social Networking Sites

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Abstract

Dyadic social relations are known to exhibit homophily – attraction and bonding between similar individuals – and recent studies have detected homophily also on the social network level. Here, we investigate whether social media networks exhibit signs of homophily with regards to life stages. Using a large and global database (N=111,863) of social media profile pictures, we investigate proportions of picture types in an individual's social network. Typical stages of young adulthood include peer group formation, mate searching, union formation, and parenting. We studied to what extent different association categories with pictures of one or several individuals correlated with each other. Results showed that users with a profile picture of a single individual were more likely to have other profile pictures of single individuals of the opposite sex, but not of the same sex, in their social media network. Profile pictures of heterosexual couples were more likely to appear with other heterosexual couple pictures, and profiles with baby pictures were strongly associated with the frequency of other baby pictures within the same network; both of these types were negatively associated with the frequency of pictures of singles. Pictures of two females together were positively linked with the largest number of other association types. The results probably reflect both selection and contagion effects. We conclude that contemporary social media networks appear to exhibit homophily in displays related to mate searching, pair bonds, and the transition to parenthood.

Keywords: social networks; social media; life course; homophily; mating; marriage; parenthood; female bonds

Introduction

Homophily is the tendency for people to cluster with those that are similar to themselves and has been studied for over 50 years in experimental psychology and the social sciences (e.g., Byrne, 1961; Byrne, 1997; Montoya and Horton, 2013). People prefer to associate with others who share a whole variety of traits, from mostly stable demographic traits (e.g. generation, gender, ethnicity: Ibarra, 1992; Lee and Gudykunst, 2001), to those that could be more flexible over one's lifespan (e.g. social status: DeScioli and Kurzban, 2009, education and occupation: Kalmijn, 1994; Mare, 1991 or ethical views: Byrne, 1962; Park and Schaller, 2005).

Social similarity is known to occur through a number of different causes, both proximal (e.g. having positive associations with one's own interests which lead to positive associations with those with similar interests: Byrne et al., 1971; Kaplan and Anderson, 1973) and distal (identifying similarities with another person might suggest they are kin or come from a similar ethnic or cultural group, making them a useful and trustworthy ally in future interactions: Launay and Dunbar, 2015; McElreath et al., 2003). Social similarity can denote both a psychological preference, the "love of the similar", and/or a structural network characteristic, equal to homogeneity (Wimmer and Lewis, 2010).

For most individuals today , school is the first life stage in which they are grouped with people of a similar age. As we get older, age and institutional settings continue to shape network characteristics (e.g. the influence of

colleagues). Homophily can also be expected to include the central events and transitions (e.g. getting married, having a first child) shaping an individual's life course (Elder, 1994; Kahn and Antonucci, 1980; Wrzus et al., 2013). However, relatively few studies have investigated similarities in life stages within social networks.

In this regard, the concept of life stages is central to both life history and life course theory. Based on life history theory as first developed in evolutionary biology, individuals are assumed to allocate resources to three main processes: growth and development, mating, and reproduction and parenting (e.g. Hill and Kaplan, 1999). In the human life cycle, these domains are differently prioritised depending on various factors including the individual's life stage and socioeconomic status (Virpi, 2009; David-Barrett et al. 2016) and require different kinds of support from available kin and peer social networks (Geary and Flinn, 2001; Geary et al., 2003; Hall, 2011; Rose and Rudolph, 2006). Typically, bodily and cognitive growth are crucial in childhood and adolescence, when received parental investment and peer relations are central to social life. Most mating efforts are made in adolescence and young adulthood, with their focus on peer relations, followed by a focus on the chosen romantic partner and spouse (Jo et al., 2014). This is followed by a shift to parenting effort by middle adulthood, possibly followed by a return to the "mating market" at some stage. Sociological studies of the human life course have made similar distinctions based on age and life stage (e.g. Elder, 1994; Hutchison, 2015) as the ones used in life history theory. The five central principles of life course theory emphasize lifelong development, human agency, the importance of temporal and spatial

context, the effect of timing of life events, and – crucially – the concept of linked lives (Elder et al., 2003). Linked lives refers to the interdependence embedded in human sociality. It also suggests that individual life transitions may reflect on the transitions of other individuals, e.g. so that a woman's transition to parenthood entails her own mother's transition to grandparenthood (ibid., pp. 13-14). However, life course studies do not directly link mating and parenting resource investments to different life stages, nor do they explicitly consider trade-offs between these different types of investments at different life stages in the way life history theory does (Alwin, 2012).

Homophily may result from selection or contagion as well as different combination or feedback loops of these two processes. Regarding the life course, selection means that individuals either actively or passively acquire others in similar life stages into their social network, as e.g. when young parents befriend each other at the playground (Mcpherson and Smithlovin, 1987). Contagion refers to the fact that as members of a friendship circle get married or have children, this behaviour is likely to encourage spread, putting social pressure or incentives on others within that group to move into the same life stage, alternatively to leave the group in order to affiliate with another (Christakis and Fowler, 2007). This distinction is related but not identical to the tendency of familiarity to breed similarity and vice versa: close people tend to become more similar over time (Lewis et al., 2012) and maintain friendships better with those who are similar (Burt, 2000; Tuma and Hallinan, 1979). Additionally, friendship itself is both selective and contagious: friendship networks may merge, so that people easier become friends with the friends of a friend, which further

enhances the similarities between the original friend dyad (Wimmer and Lewis, 2010).

Life stage homophily is often assumed to happen in relation to marrying and parental status (e.g. Lois and Becker, 2014). However, there is to date surprisingly little evidence to support this with data from actual social networks. Thus a classic study on homophily in social networks (McPherson et al., 2001) mentions similarity in "family roles" only in passing. Several important studies have tracked the changes in social networks across the life course (e.g. Kalmijn, 2003; Kalmijn, 2012), and recent investigation using social network analysis has started to reveal how diverse the traits that spread amongst friendship groups can be in relation to health-related measures (Christakis and Fowler, 2007; Schafer, 2015) or marital behaviour (McDermott et al., 2013). We know of no previous large-scale study investigating how mating, union formation and having children relate to social network similarities. Among existing research, most have studied network changes in relation to the transition to parenthood. One early study found that after having a child, parents increased contact frequency with some kin and also with other parents of small children (Belsky and Rovine, 1984). Some existing large-scale studies have also explored the transmission of fertility behaviour, finding that childbearing among friends, neighbours (ibid.), and especially strongly among siblings make the individual more likely to become a parent (Lyngstad and Prskawetz, 2010).

Mating behaviour is less studied than parenting (but see: Christakis and Fowler, 2007; Kalmijn, 2012; McDermott et al., 2013; Munch-Rotolo, 2000) and previous studies tend to focus on the "contagiousness" of e.g. marrying or divorcing,

rather than on the social network composition in relation to marital behaviour or childbearing. A notable exception is the study of dating sites by Fiore (2005), which found that the potential partners preferred interacting with others of similar demographic characteristics and similar perceived attraction value.

Here, we use a large and global data set of social media networks in order to explore assortative associations in social networks. We investigate whether different picture categories appear assortatively within individual user networks. We are especially interested in whether picture types that can be interpreted as related to life stages related to mating and parenting exhibit homophily.

While we expect homophily to arise between picture categories, it is clear that similarity is not necessarily the preferred or most advantageous at all stages (Rivera et al., 2010). For instance, when a single heterosexual person is looking for a spouse it does not make sense to team up only with other same-sex individuals. In certain key stages, by contrast, such as forming a romantic union or raising a small child, it would make intuitive sense to affiliate with people in similar stages with similar interests as well as to exclude others with competing interests (i.e. excluding single people from networks of couples).

Data, methods and hypotheses

Following Christakis and Fowler (2007) we use Facebook profile pictures as providing a unique access into different types of people and their associations. Profile pictures tell us something both about the signals (of e.g. cultural taste, or

dating status) the user wants to send to his social network, and about how common a similar signal is among the user's social network 'friends'. Profile pictures are typically both idealised self-representations and relatively accurate depictions of the account owner's actual self. While some profile pictures represent e.g. artistic or political statements, pictures of people remain the preferred choice for Facebook profile pictures and these pictures have been found to represent the account owner and his or her social circle (Back et al., 2010). We measure homophily in the structural sense (correlations indicating similarity) although the nature of our data does not exclude that the associations are formed by psychological preferences (Wimmer and Lewis, 2010).

We used a recently published Profile Picture dataset which focused on gender differences in close friendship (David-Barrett et al., 2015). This dataset contains the profile picture type of 309 individuals and all their altogether 111,863 friends.

The dataset was constructed the following way (David-Barrett et al., 2015). First, the coders used random search terms to select 309 users of Facebook, all of whom share their friends publicly. In line with the original study of the dataset, we refer to these users as "seed". These 309 seed users had on average 362 friends. Second, the 111,863 profile pictures of all friends of all the 309 seeds were located and categorised into the types of picture described in Table 1.

The objective of the categorisation was to identify those pictures that contain only same aged adult humans ("peers") with identifiable gender (David-Barrett et al., 2015). According to Facebook rules, age and other demographic characteristics were not publicly accessible information in most cases, and thus

were not collected. Therefore, the categories contain a set of types that do not fit this stipulation: pictures that contain nonhumans (often a pet or an object), pictures that are not being shared publicly, pictures that contain several people who appear to be from different generations (for instance, a mother and a child or a family), pictures with a a non-adult human (coded "child or baby"), pictures that have been clearly manipulated (for instance multiple pictures combined into one), or pictures of adults, the gender of which the coder was unable to identify. All the remaining profile pictures fall into the original definition of adult peers (containing only humans, only adults, belonging to the same generation compared to each other, and having a proper picture from which the coder could identify the gender). These peer pictures where coded with regards to the number of women and men on the picture.

Although it is impossible to provide an exact estimate as to what extent the data is representative of the 2011 Facebook-user population, the fact that the 188 seeds coded were associated by the coders with 9 different regions of the word (Europe: 56 seeds, Middle East and North Africa: 14, Central and South Asia: 16, South East Asia: 43, East Asia: 19, Australia: 9, Sub-Saharan Africa: 7, Latin America: 9, North America: 14) suggests that the random seed selection method did result in a sample that is at least to some extent representative. (Note that the regions were coded only for part of the sample.)

For this analysis, we combined the original 21 categories into 12 new categories for clarity (Table 1).

Code	Description	%
NH	Not human picture: e.g., object, landscape, monster, car, or any picture with an animal	12.9
NA	Not publicly available (or Facebook default profile)	1.5
NP	Multiple people but not peer: e.g., mother-child, a family	2.5
CB	Child or baby	3.2
MP	Multiple pictures, collage	1.8
CTG	Can't tell gender	2.3
1F	1 female	30
2F	2 females	3.3
1M	1 male	28.4
2M	2 males	2.2
1F1M	1 female + 1 male (e.g. a heterosexual couple)	6.3
3+	Three or more people in the picture	5.9

Table 1. Coding categories adapted from (David-Barrett et al., 2015).

We will assume that pictures of one male and one female usually represent heterosexual romantic couples. Of course, some of these may also represent siblings, cousins or opposite-sex-friends, but our previous study detected an exceptional frequency of 1M1F pictures among pictures of two peers, strongly

suggesting that heterosexual romance is as its core (David-Barrett et al. 2014). Of pictures with same-sex dyads (two males or two females), previous results of the same database suggest that the majority are peers (siblings or close friends) who are not romantic partners (David-Barrett et al., 2015). Pictures of babies and children depicting the account user in youth have in recent years become popular, but the data for this study was collected in 2011, which was well before the trend to post self's baby pictures. We therefore assume that most pictures of babies and children represent children of the account owner.

We measured homophily as positive associations between the same picture categories or as negative associations between different picture categories.

For each seed type and each friend type, we calculated the percentage deviation of the relative frequency of the friend type compared to the entire dataset, expressed in percentage. That is, we measured if the likelihood that an individual associates with a particular type of person(s) (e.g. a single female) is greater or lesser relative to how everybody else (all seeds) associates with that particular type of person(s) (e.g., single females). Formally:

$$\frac{\overline{a}_{i,j}}{\overline{a}_j} - 1 \qquad (1)$$

where a_j is the frequency of type j profile picture averaged across all the seeds, and $a_{i,j}$ is the average frequency of type j profile picture averaged across seed type i. Note that this is not a symmetric measure, so that the reversed association does not necessarily hold in all cases.

We hypothesized that displays of profile pictures reflecting mating status (single or couple) and of parenthood (pictures of baby or child) would exhibit homophily of social networks. Mate searching and the transition to parenthood are of huge importance in the adult life course and are also partially exclusive, since investment in mating effort may exclude reproductive effort and vice versa (Alvergne et al., 2009).

Results

Results suggest that homophily is not equally distributed among types of profile pictures, as there were big differences in the number and strength of associations of some seeds (see Table 2 for the overview, and Fig. 1 for the key results).

	Non-human	NA	Non-peer	Child or baby	Montage	Gender uncertain	1 female	2 females	1 male	2 males	1 female + 1 male	More than 3 people
Non-human	81	.	.	.	21	.	13	53	13	.	27	.
NA	44	.	42	89	61	68	.	.	.	32	52	.
Non-peer	.	.	.	.	.	.	.	.	.	.	.	.
Child or baby	.	.	.	407	.	.	.	.	.	.	.	60
Montage	26	.	.	.	.	.	.	.	.	.	.	.
Gender uncertain	.	630	.	.	.	.	.	.	.	.	.	.
1 female	.	.	.	.	43	.	.	.	28	.	.	.
2 females	.	.	.	.	.	.	.	133	.	153	81	91
1 male	29	.	.	.	.	.	29	.	.	.	.	.
2 males	.	.	60	.	.	.	.	108	.	50	.	.
1 female + 1 male	.	.	.	.	.	.	.	.	.	.	63	.
More than 3 people	.	.	.	.	.	34	.	.	.	64	.	58

Table. 2. Deviation from the average frequency of friends' profile picture category as dependent on the seed's category, in percentage. This is a measure of the strength of the association, the greater the value – the more they deviate from the average – the stronger the homophily within a given profile picture category. Green: positive association of the seed with the particular picture category, red: negative association. Values are depicted if p<0.05. Dots: p>0.5.
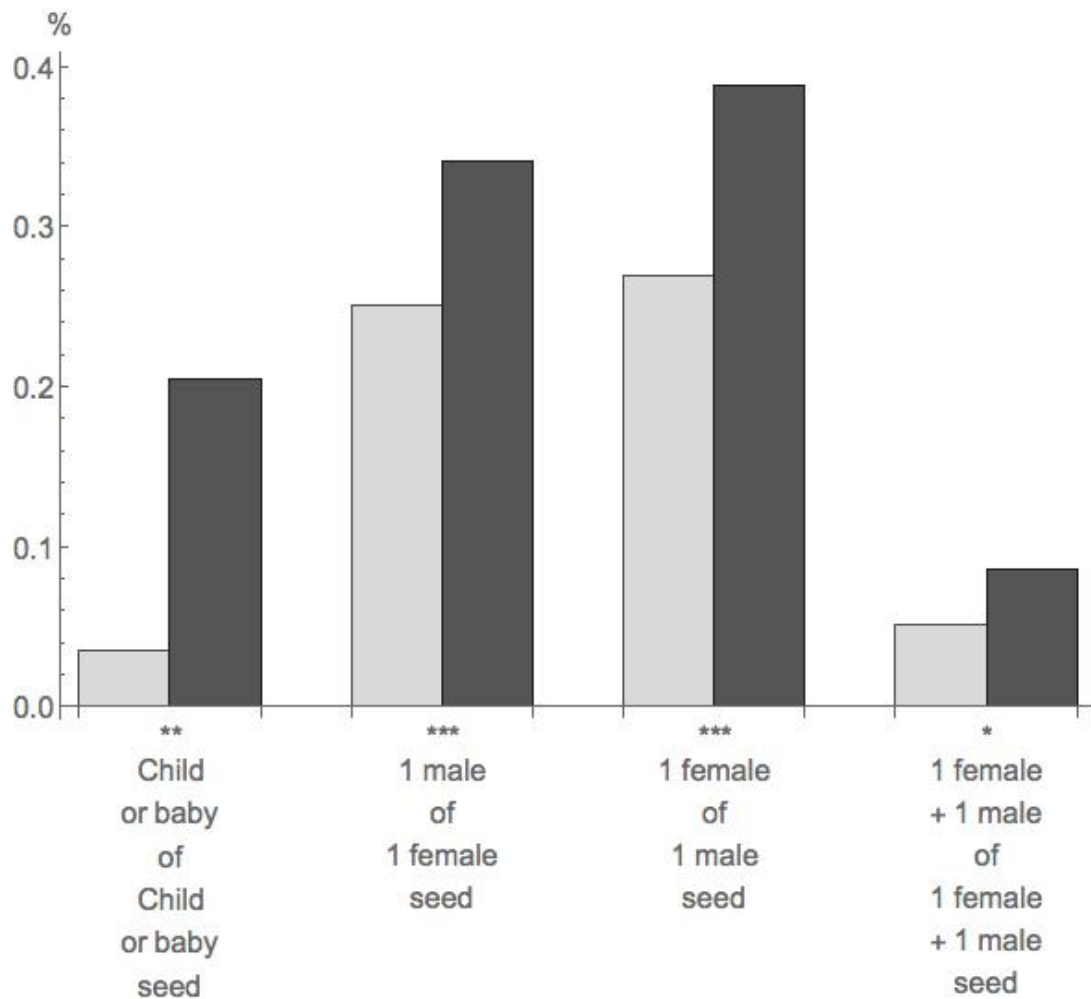
Fig. 1. Deviation from the average frequency of friends' profile picture category in relation to the seed's picture category, %, selected key relationships based on Table 2. Dark grey: category seed, light grade: all other seeds.

Profile pictures of singles

Profiles that depict a woman alone (1F) on the profile picture are more likely to have social media friends that use a profile picture depicting either a man alone (1M) or a manipulated photo (MP). Vice versa, profiles that display a man alone (1M) tend to have friends whose profile picture displays a woman alone (1F).

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Thus both single male and female profile pictures (1M and 1F) are associated with single person profile pictures of the opposite sex. One could speculate that this suggests that some of the people who are (or wish to appear as) single might be using social network sites to pursue dating either actively or passively, advertising mating status or availability through their profile picture choice.

The above interpretation might be further supported by the non-human (NH) profile pictures, which tended to include displays of mostly male hobbies (cars, motorbikes, particular basketball shoes). The positive association of non-human picture with single male pictures, and their negative association with single female profile pictures, may indicate that non-human pictures signal male cultural group markers (e.g., particular basketball shoes, particular motorbikes, etc.) who are not actively in search of a mating partner.

Couples

We assumed that the majority of heterosexual dyads (1F1M) reflect romantic couples (dating or married partners). People whose profile picture displays a heterosexual dyad picture have only one association: they tend to have friends who also chose couple profile pictures. This suggests a clear-cut life course homophily in this case.

Parents

Social media users who post profile pictures of a baby or child are significantly more likely to have friends with profile pictures of babies or children. This suggests that young parents tend to have young parents as their Facebook friends.

Same-sex dyads

Profiles depicting same-sex dyads (2F or 2M) tend to have friends that also display same-sex dyads, whether male of female. Given the results of the previous analysis of the dataset (David-Barrett et al., 2015), suggesting that female dyads are more frequent than male dyads are, different processes may underlie this gender similarity. Female dyad profile pictures are positively associated with heterosexual couple profile pictures, while male dyadic profile pictures are not. Homosexual friend networks and subcultures may also play a role.

Culturally transmitted homophily

Finally, the categories not related to life course stages included non-humans (NH, e.g. hobby vehicles, pets), which showed positive association with others of the same category, indicating shared cultural taste or hobbies. As mentioned above, non-human profile pictures might serve as group markers, a hypothesis that is supported by the fact that this particular category has negative associations with almost half of the other categories.

People with pictures displaying very blurred photos (cannot tell gender, CTG) have a high proportion of friends who do not have any profile picture (non applicable, NA). This may reflect a cultural trope within these social networks or a greater incentive for privacy protection. Similarly, account users who do not post any profile pictures have a negative association with half of the remaining categories, suggesting a similar social exclusiveness or privacy protection motive. (Note that the original dataset was collected in 2011 when only a small number of social network users used the NA setting (David-Barrett et al., 2015)).

It is possible that the same picture categories have different cultural interpretations in different parts of the world. For example, if one region of the world would have a cultural fashion to display a child's picture as one's profile picture (independent of the user's relationship to the child) and this tendency would appear only in this region, then we would find homophily of child pictures in the networks from this region, although it would actually reflect cross-cultural variation and not homophily of life stages. Unfortunately, the size of the database does not allow for specific cross-cultural measures. However, breaking up the data for which there is geographic information into two big regions of the world suggests that this bias is at least very limited (see Fig. S1).

Discussion

While social networks are known to exhibit homophily – attraction and bonding between similar individuals – few studies have investigated homophily in several life stages. We explored assortativeness of picture categories using a large global

data set of 112 thousand profile pictures spanning all continents. Our results suggest an association between life stages and profile picture types with regards to mating and parenting roles. Individuals who posted single profile pictures were more likely to have singles of the opposite site in their networks. Profile pictures of heterosexual couples and of babies and children were also more likely to appear within social media networks with similar profiles.

Homophily is a universal human trait, yet not all life stages and types of people express the trait to equal degrees or in analogous ways. The crucial stages of young adulthood include peer group formation, mate searching, union formation, and parenting, and our results support homophily in these categories. Profile pictures of non-peers were, however, not associated with each other.

Pictures associated with cultural membership and markers (e.g. affiliation to clubs, hobbies) exhibited higher homophily than average. This may reflect peer group membership and is also in line with previous research demonstrating stylistic contagion in social media (Welbers and de Nooy, 2014).

Given the nature of social media, profile pictures may represent actual life situations (being single, being newly wed, having become a parent) as well as signalling intended use of the social media platform (i.e. attract mates, show off your spouse or marital/family status, discuss babies and other instrumental uses). Pictures with no relation to the everyday life of the actual user are rare (Back et al., 2010).

A first possible explanation for the similarity of photographs between friends is cultural contagion: that individuals tend to match their own chosen images to

those of their friends' on Facebook, and that this tendency would occur regardless of actual interests, life stage or other features of their individual lives. One driver for this tendency is social conformity (Freeman and Webster, 1994). In the case of profile pictures with no photos or photos of uncertain gender, we detected such an association, which may signal shared subcultures and values. This may have either caused them to initiate a friendship, or may have developed over time as a consequence of their interests. Having photographs of similar non-human objects is likely to be an indicator of this general similarity or convergence of interests.

The second explanation applies to life course homophily, the tendency to cluster with those who are at a similar life stage, and would be using Facebook in a similar manner. This is not likely to apply to all of the examples of similarity that have been illustrated here, but can be a particularly useful explanation for those profile pictures that are actively promoting aspects of one's current life stage. Profile photographs, and those including babies and children, are both clear outward indicators of the individual's current life stage.

In the case of mate search and life course homophily of young parents that this study found, we may witness a more instrumental use of Facebook. Facebook can be used as a platform from which to seek mates, or opportunities for allocare (Hrdy, 2009) and parenting advice. Association with other parents on Facebook could be an effort – conscious or not – of creating and finding communities of mutual rearing and support of children.

Our results suggest that people actively use social media to signal their life stage. Future studies could explore how consciously this is done, and for what possible

expected feedback or gains. It would also be interesting to explore how other life course transitions, such as changes in hobbies, student and working life are reflected in social media profiles. Both of these questions were beyond the scope of our data.

The study undertaken here suggests that homophily of life stage can be assessed using a relatively economical survey of freely available information. Among its limitations is the lack of demographic details and of background information about the people in the picture. Due to the cross-sectional nature of the data, it is not possible to tease apart the different forms of homophily that have occurred. Contagion, choice and induced homophily are likely to lead to these groupings, but only longitudinal studies could identify how they affect and interact with life stage homophily in social networks over time.

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REFERENCES

Alvergne, A., Faurie, C., Raymond, M., 2009. Variation in testosterone levels and male reproductive effort: Insight from a polygynous human population. Hormones and Behavior 56, 491-497, doi:DOI 10.1016/j.yhbeh.2009.07.013.

Alwin, D. F., 2012. Integrating Varieties of Life Course Concepts. Journals of Gerontology Series B-Psychological Sciences and Social Sciences 67, 206-220, doi:10.1093/geronb/gbr146.

Back, M. D., Stopfer, J. M., Vazire, S., Gaddis, S., Schmukle, S. C., Egloff, B., Gosling, S. D., 2010. Facebook profiles reflect actual personality, not self-idealization. Psychol Sci 21, 372-4, doi:10.1177/0956797609360756.

Belsky, J., Rovine, M., 1984. Social-Network Contact, Family Support, and the Transition to Parenthood. Journal of Marriage and the Family 46, 455-462, doi:Doi 10.2307/352477.

Burt, R. S., 2000. Decay functions. Social Networks 22, 1-28, doi:Doi 10.1016/S0378-8733(99)00015-5.

Byrne, D., 1961. Interpersonal-Attraction and Attitude Similarity. Journal of Abnormal and Social Psychology 62, 713-&, doi:Doi 10.1037/H0044721.

Byrne, D., 1962. Response to Attitude Similarity-Dissimilarity as a Function of Affiliation Need. Journal of Personality 30, 164-177, doi:Doi 10.1111/J.1467-6494.1962.Tb01683.X.

Byrne, D., 1997. An overview (and underview) of research and theory within the attraction paradigm. Journal of Social and Personal Relationships 14, 417-431, doi:Doi 10.1177/0265407597143008.

Byrne, D., Gouaux, C., Griffitt, W., Lamberth, J., Murakawa, N., Prasad, M. B., Prasad, A., Ramirez, M., 1971. Ubiquitous Relationship - Attitude Similarity and Attraction - Cross-Cultural Study. Human Relations 24, 201-&, doi:Doi 10.1177/001872677102400302.

Christakis, N. A., Fowler, J. H., 2007. The spread of obesity in a large social network over 32 years. New England Journal of Medicine 357, 370-379, doi:Doi 10.1056/Nejmsa066082.

David-Barrett, T., Rotkirch, A., Carney, J., Behncke Izquierdo, I., Krems, J. A., Townley, D., McDaniell, E., Byrne-Smith, A., Dunbar, R. I., 2015. Women favour dyadic relationships, but men prefer clubs: cross-cultural evidence from social networking. PLoS One 10, e0118329, doi:10.1371/journal.pone.0118329.

David-Barrett, T., A. Gosh, J. Kertesz, A. Rotkirch, K. Bhattarcharya, D. Monsivais, K. Kaski, (2016) Communication with family and friends across the life course, arXiv 1512.09114

DeScioli, P., Kurzban, R., 2009. The Alliance Hypothesis for Human Friendship. Plos One 4, doi:10.1371/journal.pone.0005802.

Elder, G. H., 1994. Time, Human Agency, and Social-Change - Perspectives on the Life-Course. Social Psychology Quarterly 57, 4-15.

Elder, G. H., Johnson, M. K., Crosnoe, R., 2003. The emergence and development of life course theory. In: Mortimer, J. T., Shanahan, M. J., Eds.), Handbook of the Life Course. Springer.

Fiore, A. T., & Donath, J. S., 2005. Homophily in online dating: when do you like someone like yourself? CHI'05 Extended Abstracts on Human Factors in Computing Systems, 1371-1374.

Freeman, L. C., Webster, C. M., 1994. Interpersonal Proximity in Social and Cognitive Space. Social Cognition 12, 223-247, doi:Doi 10.1521/Soco.1994.12.3.223.

Geary, D. C., Flinn, M. V., 2001. Evolution of Human Parental Behavior and the Human Family. Parenting-Science and Practice 1, 5-61, doi: 10.1207/S15327922par011&2_2.

Geary, D. C., Byrd-Craven, J., Hoard, M. K., Vigil, J., Numtee, C., 2003. Evolution and development of boys' social behavior. Developmental Review 23, 444-470, doi:Doi 10.1016/J.Dr.2003.08.001.

Hall, J. A., 2011. Sex differences in friendship expectations: A meta-analysis. Journal of Social and Personal Relationships 28, 723-747, doi:Doi 10.1177/0265407510386192.

Hill, K., Kaplan, H., 1999. Life history traits in humans: Theory and empirical studies. Annual Review of Anthropology 28, 397-430, doi:DOI 10.1146/annurev.anthro.28.1.397.

Hrdy, S. B., 2009. Mothers and others : the evolutionary origins of mutual understanding. Belknap Press of Harvard University Press, Cambridge, Mass. ; London.

Hutchison, E. D., 2015. Dimensions of human behavior : the changing life course. SAGE,, Los Angeles, pp. 1 online resource (xxvi, 542 pages).

Ibarra, H., 1992. Homophily and Differential Returns - Sex-Differences in Network Structure and Access in an Advertising Firm. Administrative Science Quarterly 37, 422-447, doi:Doi 10.2307/2393451.

Jo, H. H., Saramaki, J., Dunbar, R. I. M., Kaski, K., 2014. Spatial patterns of close relationships across the lifespan. Scientific Reports 4, doi: 10.1038/srep06988.

Kahn, R. L., Antonucci, T. C., 1980. Convoys over the life course: attachment, roles and social support. In: Baltes, P., Brim, O., Eds.), Life-span Development and Behavior. Academic Press, New York, pp. 253–286.

Kalmijn, M., 1994. Assortative Mating by Cultural and Economic Occupational-Status. American Journal of Sociology 100, 422-452.

Kalmijn, M., 2003. Shared friendship networks and the life course: an analysis of survey data on married and cohabiting couples. Social Networks 25, 231-249, doi:10.1016/S0378-8733(03)00010-8.

Kalmijn, M., 2012. Longitudinal analyses of the effects of age, marriage, and parenthood on social contacts and support. Advances in Life Course Research 17, 177-190, doi:Doi 10.1016/J.Alcr.2012.08.002.

Kaplan, M. F., Anderson, N. H., 1973. Information Integration Theory and Reinforcement Theory as Approaches to Interpersonal Attraction. Journal of Personality and Social Psychology 28, 301-312, doi:Doi 10.1037/H0035112.

Launay, J., Dunbar, R. I. M., 2015. Does implied community size predict likeability of a similar stranger? Evolution and Human Behavior 36, 32-37, doi:Doi 10.1016/J.Evolhumbehav.2014.08.005.

Lee, C. M., Gudykunst, W. B., 2001. Attraction in initial interethnic interactions. International Journal of Intercultural Relations 25, 373-387, doi:Doi 10.1016/S0147-1767(01)00011-6.

Lewis, K., Gonzalez, M., Kaufman, J., 2012. Social selection and peer influence in an online social network. Proceedings of the National Academy of Sciences of the United States of America 109, 68-72, doi:Doi 10.1073/Pnas.1109739109.

Lois, D., Becker, O. A., 2014. Is fertility contagious? Using panel data to disentangle mechanisms of social network influences on fertility decisions. Advances in Life Course Research 21, 123-134, doi:Doi 10.1016/J.Alcr.2013.10.001.

Lyngstad, T. H., Prskawetz, A., 2010. Do Siblings' Fertility Decisions Influence Each Other? Demography 47, 923-934, doi:Doi 10.1007/Bf03213733.

Mare, R. D., 1991. Five decades of educational assortative mating. American sociological review, 15-32.

McDermott, R., Fowler, J. H., Christakis, N. A., 2013. Breaking Up Is Hard to Do, Unless Everyone Else Is Doing It Too: Social Network Effects on Divorce in a Longitudinal Sample. Social Forces 92, 491-519, doi:Doi 10.1093/Sf/Sot096.

McElreath, R., Boyd, R., Richerson, P. J., 2003. Shared norms and the evolution of ethnic markers. Current Anthropology 44, 122-129, doi:Doi 10.1086/345689.

Mcpherson, J. M., Smithlovin, L., 1987. Homophily in Voluntary Organizations - Status Distance and the Composition of Face-to-Face Groups. American Sociological Review 52, 370-379, doi:Doi 10.2307/2095356.

McPherson, M., Smith-Lovin, L., Cook, J. M., 2001. Birds of a feather: Homophily in social networks. Annual Review of Sociology 27, 415-444, doi:Doi 10.1146/Annurev.Soc.27.1.415.

Montoya, R. M., Horton, R. S., 2013. A meta-analytic investigation of the processes underlying the similarity-attraction effect. Journal of Social and Personal Relationships 30, 64-94, doi:Doi 10.1177/0265407512452989.

Munch-Rotolo, A. C., 2000. Childrearing, social contact, and depression: A structural analysis of the transition to parenthood., Department of Sociology, Vol. PhD. University of Arizona.

Park, J. H., Schaller, M., 2005. Does attitude similarity serve as a heuristic cue for kinship? Evidence of an implicit cognitive association. Evolution and Human Behavior 26, 158-170, doi:Doi 10.1016/J.Evolhumbehav.2004.08.013.

Rivera, M. T., Soderstrom, S. B., Uzzi, B., 2010. Dynamics of Dyads in Social Networks: Assortative, Relational, and Proximity Mechanisms. Annual Review of Sociology, Vol 36 36, 91-115, doi:10.1146/annurev.soc.34.040507.134743.

Rose, A. J., Rudolph, K. D., 2006. A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. Psychological Bulletin 132, 98-131, doi:10.1037/0033-2909.132.1.98.

Schafer, M. H., 2015. On the Locality of Asymmetric Close Relations: Spatial Proximity and Health Differences in a Senior Community. Journals of Gerontology Series B-Psychological Sciences and Social Sciences 70, 100-110, doi:10.1093/geronb/gbu043.

Tuma, N. B., Hallinan, M. T., 1979. Effects of Sex, Race, and Achievement on School-Childrens Friendships. Social Forces 57, 1265-1285, doi:Doi 10.2307/2577270.

Virpi, L., 2009. Life-history theory, reproduction and longevity in humans. In: Dunbar, R. I. M., Barrett, L., Eds.), Oxford Handbook of Evolutionary Psychology. Oxford University Press, Oxford.

Welbers, K., de Nooy, W., 2014. Stylistic Accommodation on an Internet Forum as Bonding: Do Posters Adapt to the Style of Their Peers? American Behavioral Scientist 58, 1361-1375, doi:10.1177/0002764214527086.

Wimmer, A., Lewis, K., 2010. Beyond and Below Racial Homophily: ERG Models of a Friendship Network Documented on Facebook. American Journal of Sociology 116, 583-642, doi:Doi 10.1086/653658.

Wrzus, C., Hanel, M., Wagner, J., Neyer, F. J., 2013. Social Network Changes and Life Events Across the Life Span: A Meta-Analysis. Psychological Bulletin 139, 53-80, doi:10.1037/a0028601.