Supporting Information

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SI Text

In this Supporting Information we present further details relating to the network dynamics of the community.

Cycles in the Posting Behavior. The community we study is, of course, not decoupled from the rhythms of life. In Fig. S1, we plot a power-spectrum of the posts (or rather the occasions of the posts). Peaks in this plot correspond to cycles of a certain frequency. We see one major long-term peak at ~0.14 days^{-1}, corresponding to 1 wk. There are probably 24 h (circadian) rhythms too, but invisible due to our one-day resolution. The weekly, rhythm was not seen in a study of an Internet dating community (1), but it was observed in e-mail exchange (1) and Internet traffic (2).

Evolution of Number of Posts. In Fig. S2, we see that the number of posts by both the sex buyers and sex sellers are superlinear (indeed close to exponential) functions of the time elapsed between the first and last post ΔT. This means that the sex buyers who have been active the longest are also those who post most often. Like other reported phenomena, this effect may result from positive feedback, where some members become more active with time. The most conspicuous outliers among the sex workers have a strength value (number of posts about them) of about 80 posts over around 200 days. These outliers suggest a scenario in which some sex workers are much requested at some point, but then stop working for some period of time. Compared to the

sex workers, buyers deviate less from the trend, with few members being very active over only a short period of time.

Degree Distribution. Assuming an attachment kernel of the form k^δ where δ is a positive constant, we find a sublinear preferential attachment. According to ref. 3), this would lead to a stretched-exponential degree distribution. In Fig. S3, we fit the degree distribution to a stretched-exponential form and, except for the lowest degrees, we find a good fit, and a fairly good validation of our assumption.

Strength Distribution. In Figs. 1*G* and *H* in the main text, we examined the degree distribution of the two types of nodes. As the degree does not count repeated contacts, it does not fully capture the activity of the sex buyers and sex sellers. In Fig. S4 we plotted the distributions of strength, the total number of encounters reported by a sex buyer, or about a sex seller. We know from Table 1 in the paper that most contacts happen only once. It is thus not very surprising that the strength distribution is similar to the degree distribution. Just like the inter-event-time distribution (4, 5) and degree distribution, the functional form can be described by a power-law with exponential cutoff. The cutoff is lower for buyers than sellers, which probably has many contributing reasons, one being economic: A larger strength value means higher income for the sex sellers but greater cost for the sex buyers.

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3. Krapivsky PL, Redner S, Leyvraz F (2000) Connectivity of growing random networks. *Phys Rev Lett* 85:4629–4632.
4. Barabási A-L (2005) The origins of bursts and heavy tails in human dynamics. *Nature* 435:207–211.
5. Hidalgo CA (2006) Scaling in the inter-event time of random and seasonal systems. *Physica A* 369:877–883.
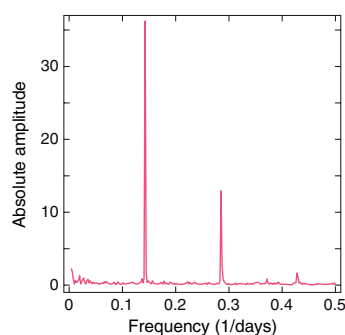
Fig. S1. The power spectrum of the posts. The largest peak corresponds to one-week cycles (the following two peaks are corresponds to multiples of 1 wk, i.e., they do not carry more information than the first peak).
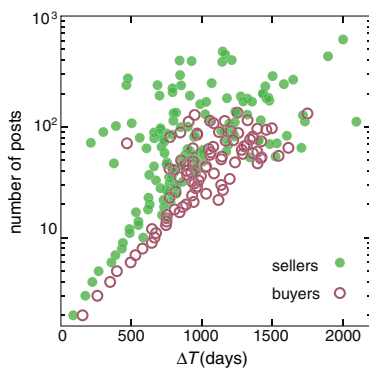
Fig. S2. The total number of posts (about a sex seller or that a sex buyer has posted) as a function of the time in the community (the data is logarithmically binned along the abscissa).
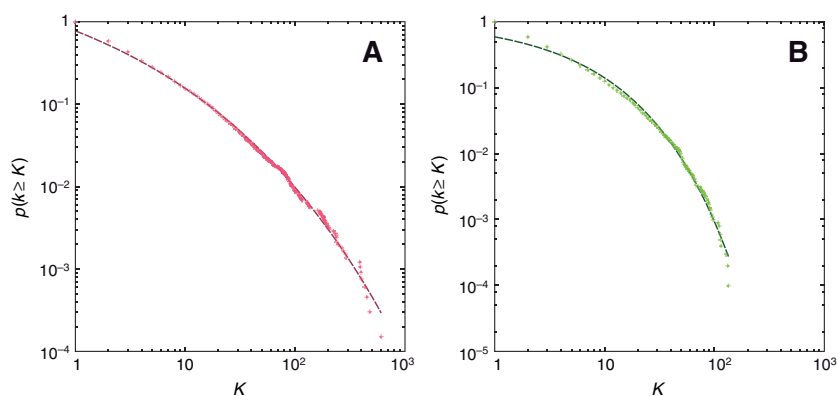

Fig. S3. Cumulative degree distributions (same as in Fig. 3 in the paper) and stretched exponentials $A \exp(-(BK)^C)$ fitted with the Levenberg–Marquardt method. (*A*) shows the curve for sellers, (*B*) the curve for buyers. We obtain the parameter values (sellers) $A = 7.2 \pm 1.5$, $B = 30 \pm 12$, $C = 0.24 \pm 0.01$; and (buyers) $A = 1.0 \pm 0.2$, $B = 0.36 \pm 0.06$, $C = 0.55 \pm 0.02$.
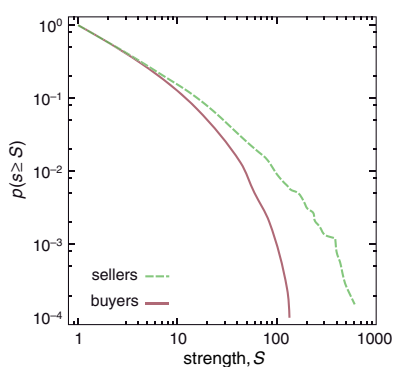

Fig. S4. Cumulative distribution of the number of posts that a sex buyer has posted, and in which a sex seller is posted about.