

'Dear Dylan': I'm getting ripped off in my group house!

By Dylan Matthews, Updated: August 24, 2013

We're [back](#)! And this time, instead of poaching questions from our corporate siblings at Slate, we've got queries of our own. Yeah, get excited. For the last installment, [click here](#).

Question: I recently moved into a house in Petworth with a friend and some of her acquaintances. The room was much cheaper than my previous room, and I really liked the location. My friend's acquaintance had been living in the place and stayed on the lease. She told me the room prices were negotiable because they aren't specifically designated in the lease.

However, after a few weeks, I realized that she was paying \$800 for a room that is twice the size of mine, and I'm paying \$825. The two other rooms are similarly sized and priced. There's a good amount of common space, and everyone has nice windows. When we measured out the dimensions and compared to how much we are all paying, I should be paying \$300 less a month, and the girl with the largest room should be paying \$300 more. When I brought this up, she panicked for obvious reasons. How can I get a fair price for my room without creating a lot of tension in the house?

— Ripped-off Roommate

Answer: This is a great example of what's known in game theory as "[fair division](#)" [problems](#), which are problems dealing with how to divide up a set number or amounts of good fairly across a group of people. In fact, rent-sharing is a canonical fair division problem; it's commonly referred to in the literature as the "housemates problem" or the "**room assignment-rent division problem.**"

In a fair division problem, you first have to categorize the things you're dividing. You're dividing two things: the rooms of the house and the rent. The former is *indivisible*; we're assuming you're not going to assign people fractions of rooms here. It's also *heterogenous*, as the rooms differ in a number of important respects, and it's *desirable*. You all want the best room. By contrast, the rent is *divisible* (you can split it up any which way you like), *homogenous* (one dollar's the same as the next) and *undesirable* (you all want to get as little of it as possible.)

What you want is an efficient procedure that produces an *envy-free* result to both of those division problems. That's a technical term for a distribution where each person thinks that what they got is at least as good or better than any other possible outcome. There have been a [number](#) of [papers](#) proposing [different mechanisms](#) for solving the housemates problem, so

for the sake of illustration I'll use one that Atila Abdukladiroğlu (then at Columbia, now at Duke), Tayfun Sönmez, and M. Utku Ünver (both at Koç University, now at Boston College) proposed in a [2004 paper](#). It works more or less like an auction, except that when you bid one room up, all the other ones get cheaper.

Let's say the house's monthly rent is \$5,000 a month, it has five rooms, and there are five roommates. Assign each of the rooms the initial price of \$1,000 (the cost of the whole place divided by the number of rooms). Then have each person name the room they want to live in. Say it works out like this:

Two people want room one, two want room two, and one wants room three. Rooms four and five are unclaimed. What the Abdukladiroğlu/Sönmez/Ünver auction procedure has you do is up the price on any "overdemanded" rooms, or rooms that more than one person wants, and reduce the prices of the other rooms accordingly. Let's say you up the price by \$60. So rooms one and two are now \$1,060 each and rooms three, four, and five at \$960 each, as $\$1,000 - ((\$60 + \$60) / 3) = \960 . Let's say that gets one of the guys in room two to relent:

But room one is still overdemanded. So let's say you boost the price by \$80. It's now \$1,140 and the other four rooms split the savings: room two is \$1,040, three, four and five are \$940. That's enough to get one of the room one guys to relent. You've got your equilibrium result:

Now, this might take longer and make the differentials in room prices bigger in your case, but the same procedure works. Keep in mind also that the increases in price for the overdemanded rooms are arbitrary in size. If you have the time, you could use increments of \$1 or 1¢ if you really want a fine-grained result.

Abdukcladiroğlu, Sönmez and Ünver prove that the mechanism produces an envy-free solution in each case. And as noted Lars Svensson has [proven](#), the envy-free result is also the efficient result. Hooray!

But they note that it's not *strategy-proof*. That is, it can be gamed by people misrepresenting their actual preferences throughout the auction. So this only really works if you trust that your roomies are truthfully representing their positions. It seems clear from your letter that you, at the very least, think your friend's acquaintance is a liar and a thief prone to lying and thievery and the whatnot. So maybe you want something that's strategy-proof.

Computer scientists Lachlan Dufton and Kate Larson at the University of Waterloo (it's like the MIT of Canada) have [the auction you're looking for](#). They use randomization to develop a procedure that produces strategy-proof solutions to the housemates problem. It's [impossible](#) to guarantee the solution will always be envy-free, but the auction procedure tries to minimize envy at the very least, and achieve envy-freeness at best.

The details are complicated but basically you randomly select one person to be "ignored," have the others divvy up rooms based on their stated preferences, and then give that person the leftover room. It's strategy-proof, so no one can gain from misrepresenting their preferences, and it's envy-free for everyone but the ignored person.

Anyway, I recommend you use one of the above processes to come to prices for the various rooms in your house, and to assign yourselves to rooms. If everyone plays fair, then you're

guaranteed that no one will be worse off than if they'd gotten another room. If they don't play fair, then things will still work out for everyone other than the unlucky schmuck who gets ignored.

And this beats basing payments on square footage, since that doesn't account for the fact that there are diminishing marginal returns to square footage. The difference between 50 square feet and 100 is quite significant. The difference between 5,000 square feet and 5,050 square feet is a rounding error. I see the temptation to just set a flat per-square-foot rate, but let the market work its magic is ultimately better than just setting a fixed per-square-foot price by fiat.



Online dating done right.

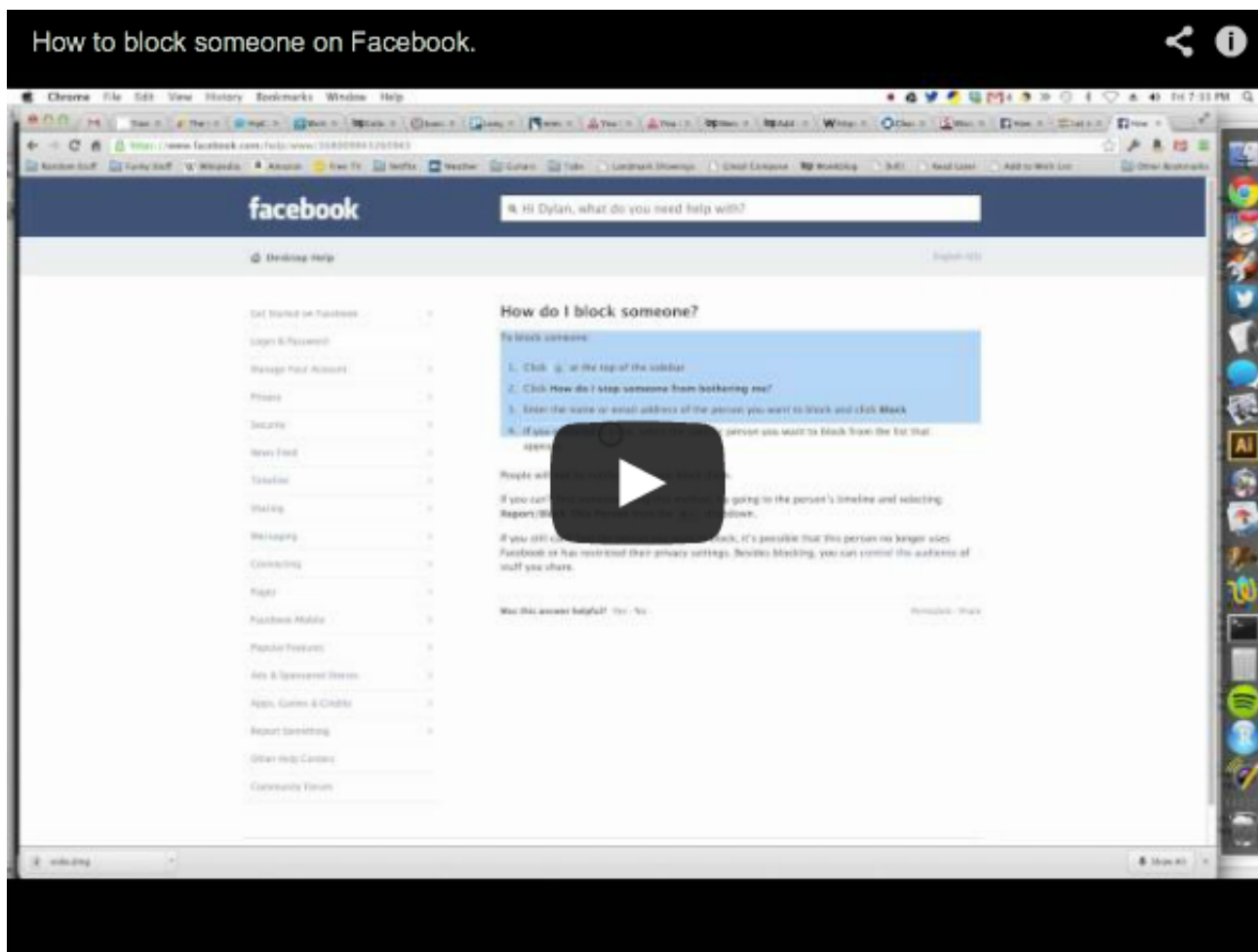
Question: In April I began a relationship with a guy I met on Match whose daughter went to school with mine. Turns out the whole time we dated he was sleeping with a married woman. They had been together for over 3 years. Yes, we had the “I’m not sleeping with anyone else, how about you?” talk to which we both professed our fidelity. Now we have broken up, they have broken up (like, really?), and I’m receiving hate emails almost daily. I ignore them, but they are specific and twice I’ve been threatened. This is all beneath me and really not representative of the types of people I normally engage with. It’s like I’m being sucked into their white trash abyss. I just want away from these people.

Any advice?

— Fooled by the White Trash

Answer: First of all, the term “white trash” is classist garbage and you should immediately purge it from your vocabulary. Done? Good.

I emailed to follow-up and you clarified that you don't know for sure where these emails — which are actually Facebook messages, if we're being precise here — are coming from, but suspect they're from your ex-boyfriend's married ex-girlfriend. So you should block that person on Facebook. Here, I made a video showing you how you could have just Googled this and solved your problem as soon as it emerged:



And you're “away from those people” (again, “those people”? really dude?). Not enough? Still getting messages from mystery accounts? [Report them](#) for a terms of use violation to Facebook. But basically this just seems like a situation where blocking would solve all your worries. Also Google. It's your friend.

However, I suspect this isn't actually your problem. Your problem is that you're obsessing over the messages and they're nagging at you, not that you just find reading them initially irritating. In that case, you should still block the person sending them, but you should also take proactive measures to combat your [“intrusive thoughts.”](#) That's the psychiatric term for

thoughts, often of a sexual or violent nature but also, especially in cases of social anxiety, faux pas or nasty social interactions, that you can't get out of your head for whatever reason. Maria Bamford [made a whole album about them](#).



The preferred treatment for intrusive thoughts of a clinical significant scale — which yours probably aren't — is exposure therapy, where you allow yourself to have the thoughts but do it in a controlled, methodical way. If all works out, over time you become habituated and desensitized to them and they cease to be controlling; see Lee Baer's [The Imp of the Mind](#) for more on this. I suspect the same would work in a less severe case like yours. Let yourself read the emails but as you do it, remind yourself that you're choosing to read and think about them and the whole process is voluntary. Over time they'll become less potent and gnaw at you less, knock on wood.

Update: The original version of this article confused Swedish economist Lars Svensson with...the other Swedish economist Lars Svensson. There are two Swedish economists named Lars Svensson, and the one here is not the one who served on the Swedish central bank. Apologies for the mixup.

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