LET'S SPEND THE NIGHT TOGETHER: A Challenge for Medically Optimal Coronavirus Social Distancing Policies

Jonathan Kelley,
International Social Science Survey & University of Nevada, Reno

MDR Evans,
Department of Sociology and Nevada Agricultural Experiment Station,
University of Nevada, Reno

Sarah Kelley,
Department of Data Science and Innovation, Child Trends

October 2020

*"Let's spend the night together
Now I need you more than ever"
Mick Jagger & Keith Richards, Rolling Stones, 1967*

Abstract (185 words)

Public health efforts aiming to slow the COVID-19 epidemic and protect the vulnerable by reducing interpersonal contact and increasing interpersonal physical distance have achieved considerable success. About three-quarters of Americans report following all the recommended practices. But there is an elephant in the room: Overnighting – staying overnight at someone else's home or having them stay overnight at your place -- is rarely mentioned publicly. But we find that overnighting is widespread throughout the epidemic thus far. In the past month, over half American adults had at least one overnight guest and about the same number (but not always the same people) spent at least one night at somebody else's home. The consequences are striking: People who overnight are more than twice as likely to report having had COVID-19. Who overnights? Overnighting is much more common among young adults (over 60% for those 25-34) than among their seniors (dipping below 40% for those age 65 and over). Moreover, risk seekers overnight much more than otherwise-similar risk-averse peers. Data: International Social Science Survey, Round 21, Cohorts 1-7, collected April –September 2020, N=9,474. Methods: Descriptive statistics and OLS.

Key words: COVID-19, coronavirus, social distancing, overnight, sleep over, sexual behavior, visiting, age, multiple regression,

INTRODUCTION

“Social distancing” is the sovereign defence against COVID-19, as it is also against many other viruses that spread human-to-human. Throughout the world during the current coronavirus pandemic, medical authorities have recommended – and many governments attempted to compel – “social distancing”. “Social distancing” has entered ordinary English-language speech as an umbrella name for recommended precautionary practices that limit contact with respiratory droplets spewed into the air when an infected person coughs, sneezes, talks or sings. These droplets can be breathed in by other people or can land on surfaces that are touched by other people who then touch their own mucus membranes and are thereby infected. The airborne droplet issue is especially acute if the spew-receiver is in close contact with the infected person (within about 6 feet) and in enclosed spaces. Most common social distancing measures are wearing masks; staying 6 feet away from others; not shaking hands; washing hands after being out in public; avoiding crowded places (churches, bars, gyms, theatres, sports venues); refraining from visiting friends in their homes or letting them visit in your home; and working at home instead of outside the home. Some authorities restrict the “social distancing” term to maintaining 6-foot physical distances from people who are not members of your household, but popular speech seems also to include the other standard precautionary measures under this rubric. In extreme situations (common throughout the world in the spring and early summer of 2020, and resurging in the autumn) was self-quarantining at home, going out only minimally if at all.

Public health policies for dealing with the coronavirus epidemic usually implicitly assume that establishing consistent social distancing behavior will in time control the epidemic, or at least stabilize it until vaccines are widely available. Evidence largely suggests that following the recommendations does reduce the risk of contracting COVID-19 (e.g. Gershuny et al 2020; Yan et al. 2020). The image they seem to have in mind is a world of nuclear families (self-sufficient singles, married couples, families with children), each living in a separate home and only interacting with people outside the family in stereotypical ways – commuting to work; at work outside the home; and out in public for medical care, exercise, shopping, at restaurants, bars, or parties, or socializing with friends (Hossain 2020, Manzo 2020). Publicly recommended distancing policies cover all these.

In practice, people in the US and in many other nations have mostly endorsed these distancing policies even at the beginning of the epidemic (McFadden et al. 2020) and throughout its peak in the US, although a minority intended to defy these strictures even from the beginning (Graham et al. 2020). They have largely, although by no means entirely, practiced them, averaging about three quarters of the maximum distancing (Azlan et al. 2020). More on that presently. This is typically at some cost – sometimes at great cost – in personal unpleasantness and financial loss – and the distress of deprivation of in-person contact seems to fall especially heavily on young unattached adults throughout the world (Hou et al. 2020, Lehmiller et al. 2020, Varshney et al. 2020, Wang et al. 2020).

But these public health injunctions discreetly ignore the elephant in the room: Overnighting. For example, the key CDC public information internet page on social distancing mentions neither having overnight guests, nor spending the night at other people's homes, nor dating, nor sexual behavior (CDC 2020). Public health authorities would doubtless hold that refraining from spending the night together is implicitly covered by the admonition to avoid home visits (e.g. refraining from home visits with friends and kin). But that mild stricture, only one among many, is insufficient to the task. People view night almost as another world where different rules apply (Melbin 1978, Zerubavel 1985). Forgoing daytime and dinner in-person visiting is a hardship, but, even early in the epidemic, had been partially compensated by a strong upsurge in the use of internet apps that facilitate video visits among family and friends (Eagle 2020). By contrast, spending the night together, especially spending it in bed together, is different: a delight when all is well – and a delight very hard to forgo voluntarily even though innovative people have tried many online approximations (Lehmiller et al. 2020). At least through May 2020, it seems that young, unattached people's in-person sexual frequency had only declined slightly (Lehmiller et al. 2020). Unfortunately, overnighting – whether romantic, couch surfing, sleeping over at a family member's home or other -- also entails a high risk of infection if the pairing is unlucky with respect to the new coronavirus, as this article will show.

We find that, even at the midst of the coronavirus pandemic, roughly half of all Americans had, within the month, someone spend the night at their home, or themselves spent the night at someone else's house, or did both. And this usually multiple times in the month. Social distancing this is not. A major challenge to public health policy it is: The spread of coronavirus through overnighting is a major risk. In fact, it is among the largest potentially controllable risks under present circumstances.

DATA

Data are from the International Social Science Survey's (ISSS's) ongoing Round 21 in the United States with nine surveys (so far) between mid-April and late September, 2020; N= 9,474 respondents to date.

In relation to the new coronavirus, reported infections per day in the US were near zero in mid-March, rising sharply to about 20,000 per day at the beginning of April and continuing their strong rise to a peak of a little over 30,000 by mid-April (all infections data are from the Johns Hopkins University database; numbers in text are from a 7-day running average to smooth out the sharp day-of-week fluctuations presumably due to reporting constraints). Our first survey was a few days after the peak, with a little over 30,000 new infections daily. The second survey a couple of weeks later was when new infections were fractionally lower, just on 30,000 cases a day. The third survey was after the decline was clearly underway at the end of May, with a little over 20,000 new cases per day. Subsequent surveys continued through the summer ;and up to late September; we have not yet covered the October rise in infections (our 10th survey, scheduled for October, is not yet in the field as this is written).

The key "others stay overnight at your house" question was asked in all nine surveys. The parallel question on "you staying overnight at someone else's home", and two follow-up questions on the loss of utility from not being able to stay overnight were included beginning only in the May survey, after we discovered how widespread sleepovers are throughout American society and how seriously it increases the risk of COVID-19.

All of the surveys so far are Amazon 'Mechanical Turk' internet-based samples. These can be conducted without risk of contracting coronavirus and, moreover, are swift, convenient, and cost effective. Internet samples of this sort have been widely used during the pandemic, for example (Imhoff and Lamberty 2020, Lehmler et al. 2020, Wang et al. 2020, Yan et al. 2020)

Mechanical Turk samples have proven remarkably accurate for multivariate analyses (Clifford, Jewell and Waggoner 2015, Cornesse and Blom 2020, Springer et al. 2016, Weinberg, Freese and McElhattan 2014), notably for political affiliations and attitudes (Clifford, Jewell and Waggoner 2015) and for science-related issues (Evans and Kelley 2011). We, too, have found that when comparing our ISSS 2017-2019 internet samples to face-to-face samples in the US and dozens of other countries (from the International Social Survey Programme's highly regarded "Inequality" series).

A disadvantage is that estimation of population means in internet samples may need to be weighted because they typically over-represent younger and more highly educated people. In multivariate analysis, of course, inclusion in the model of the variables on which the sample is not representative corrects for the compositional bias (Berk 1983), so age and education are included in all our models.

Our internet samples appear to be representative of the general population on issues related to the new coronavirus. For example, the percent proposing that coronavirus entered the human population when they "caught it from wild animals in a market in Wuhan, China", the 45% in our ISSS surveys is virtually identical to the 43% reported by Pew for their April survey on the subject (Schaeffer 2020). It is reassuring that our results – based on a non-probability Mechanical Turk sample – so closely mirror those of Pew's carefully selected nationally representative panel.

MEASUREMENT

Details on the key "spend the night together" questions are elaborated just below in the "Description" section.

All the multiple-item scales described below have good measurement properties, closely approximating the classical measurement model (Bollen 1989, Treiman 2009) with high correlations among items in each scale, scale items having very similar correlations with relevant criterion variables, and appropriately high loadings in factor analyses (see Appendix A or the supplementary materials).

For scale items and in regression analyses, answer categories are scored in equal intervals ('Likert' scoring) in equal intervals between 0 and 1 (sometimes between 0 and 100). This gives more intuitively clear means and metric regression coefficients

than scorings of 1-2-3-4-5. Although superficially ordinal, the classic Likert answer categories were designed to be treated as quantitative variables with categories spaced at equal intervals (Likert 1932) and, in practice, respondents treat them like that (Carifio and Perla 2007). For standardized coefficients (R^2 , betas, etc.) this scoring is mathematically identical to the 1-2-3-4-5 scoring or any other equal interval scoring (Nowak 2019). Metric results differ only by a simple scale factor.

Our multiple-item scales are constructed by simply averaging the component items, because such scales replicate better than those based on the factor loadings which tend to overfit (Bollen 1989). If some items in a scale were not answered (rare), the average of the remaining items was used.

Distancing is a five-item scale of how often respondent practices recommended distancing behavior: staying 6 feet away from others when out in public, not shaking hands, washing hands often, avoiding parties, avoiding going to other people's house or having them come to your house. Answers were in 7 categories from "always" (scored 1) through "never" (scored 0). Alpha reliability is a very satisfactory .84. The battery begins:

```
Some precautions help reduce the risk that YOU CATCH coronavirus. . .
One precaution is to stand at least 6 feet away from strangers in public.
Of course not everyone does that. But what about you, yourself - do YOU
stand 6 feet away?
  31% Always
  28% Almost every time
  21% Most of the time
  10% Half the time
   7% Sometimes
   2% Occasionally
   1% Never
(Total 100%; 9,456; mean= .76, sd= .23)
```

Standing 6 feet away is a typical distancing behavior and its mean of .76 (on a zero to 1 scale) is also typical for all five items. In this sense, Americans during the COVID-19 pandemic are distancing around three-quarters of the time.

Wearing **masks** is a three-item scale covering willingness to wear a face mask while shopping, at work, and other times when out in public; Alpha=.85. Statistical analysis suggests wearing masks is highly correlated with, but nonetheless somewhat distinct from, other distancing behaviors (identifying reference suppressed for review).

Having been infected with coronavirus is measured (but that only roughly and approximately) largely with a single question. Infection is a difficult thing to ascertain in a sample survey because of the varied, often trivial, and sometimes entirely absent symptoms, compounded by the stress of living through the epidemic. Our measure is no more than a rough beginning. The question:

```
Have you ever had coronavirus (COVID-19)?
  44% Definitely not
  27% Probably not
  11% Unsure
```

11%	Probably have
6%	Definitely have
1%	I have it now!
100%	(Total)
9,435	(Number of cases)

These numbers seem high, but the 7% certain that we find is only moderately higher than the 5% for March 25 (Imhoff and Lamberty 2020), a month before our surveys began. We refined these answers on the basis of an explicit question about having been tested positive for IgG antibodies (showing a prior infection) or alternatively testing positive for the presence of the virus (showing a then-current infection), treating both as showing respondent has definitely had coronavirus. With these adjustments and assuming equal intervals between answer categories, our rough approximation is 18% definitely having had coronavirus (scored 1), 7% likely to have had it (scored 0.75), 9% with a 50-50 chance of having had it (scored 0.50), 24% possibly having had it (scored 0.25), and 42% definitely not having had it (scored 0). Treating those as a (very approximate, likely exaggerated) **probability of having been infected**, the mean is 0.33 and the standard deviation 0.38. This approximation is used in the analyses that follow.

Other general population surveys have obtained similar, probably similarly exaggerated, figures – for example an AP-NORC poll in May reported 20% for "you or a close friend or relative" having been so diagnosed "by a health care provider", similar to the 17% (raw) or 21% (adjusted) we have for "definitely" or "probably" believing they have had coronavirus. UK results are similar (Thornlow 2020). Recent estimates from the CDC suggest that the medically verifiable figure is closer to 10% have had it (CDC 2020).

Demographic and background variables are measured conventionally. **Male**, **Black** and **Hispanic** are dichotomous (indicator) variables; the reference (omitted) group is White and Other. **Education** is in years of schooling and university. **Occupational status** is the new SIOM scores (Kelley and Evans, 2018), known to be largely equivalent to, and in mobility analyses often better than, the excellent Treiman-Ganzeboom ISEI scores. **Family income** is in thousands of US dollars. **Democratic** is vote intention in the 2020 US presidential election (strong Democratic = 1; leaning Democratic=.75; Independent=.50; leaning Republican=.25; strong Republican=0), included here as research even from the very beginning of the epidemic suggests considerable political polarization of COVID-19-related attitudes and perceptions (Matthewman and Huppatz 2020, Pennycook et al. 2020, April 14). **Risk-seeking** is a multiple-item scale of self-reported propensity to take risks in various circumstances (Dohmen et al 2011).

DESCRIPTION

The key "night together" question, asked in all 9 surveys, is:

In the last month did anyone stay OVERNIGHT at your house – anyone other than the people who usually live here?

44% No, nobody
 16% Yes, one person did but just for a night or two
 18% Yes, one person stayed for many nights
 13% Several different people stayed for a night or two
 7% Different people stayed for quite a few nights
 2% Lots of different people were here overnight in the last month
 (Total 100%; 9,412 cases)

After discovering the (astonishingly) large number of people who had overnight guests – and that in the midst of an epidemic – in later surveys we also asked the reciprocal question:

And did YOU stay overnight at anyone else's house in the last month?
 43% No
 18% Yes, just for a night or two
 23% Yes, for many nights at one person's house
 13% Several nights at different people's houses
 3% Quite a few nights at different people's houses
 (Total 100%; 7,161 cases)

Thus, a majority, 57%, spent at least one night at someone else's place in the last month. Fully 16% report multiple overnighting with more than one person. Thus the stereotypic image of a world of separate, largely isolated units (singles, married couples, families with children), each living in a separate residence; only interacting with outsiders in stereotypical ways – commuting to work; at work; and out in public for medical reasons, exercise, shopping, at restaurants, bars, or parties; or socializing with friends – is a daytime and early evening image. Social distancing mandates are designed for that familiar, overt world, isolating one unit from another, so hindering the spread of coronavirus (and other infectious diseases).

But things are different at night. Night is a time of intimate contacts between people normally living in separate residences. Sleepovers are, of course, not all romantic: they include visits by family and friends and overnight visitors to housemates or other family members. Night can be a wonderful time for people, but sometimes a risky one. For coronaviruses it is a happy time.

OVERNIGHTING'S INFECTIOUS CONSEQUENCES

As far as we can tell from our (admittedly rough) question on having been infected, having overnight guests roughly doubles the risk of getting coronavirus from a (probably exaggerated) 19% to around 40% or 50% (Figure 1). This is a maximum figure, without adjusting for correlated factors, a matter to which we will return shortly.

[Figure 1 about here]

Title: Figure 1. Connection between having overnight guests and getting COVID-19. Having people stay overnight at your place increases your risk of getting the new coronavirus. Self-reports, US adults 2020, April through September; N= 9,378.

 Proportion
 infected Anyone staying here overnight in the last month?

.19	No, nobody
.41	Yes, one person did but just for a night or two
.46	Yes, one person stayed for many nights
.44	Several different people stayed for a night or two
.50	Different people stayed for quite a few nights
.51	Lots of different people were here overnight

Across all the various patterns of overnighting (one person for many nights; different people for a few nights, etc.) the greatest increase in risk is between having no overnight guests and having any. Hence, it is reasonable to dichotomize the item between "no" (scored 0) and "some overnighting" (scored 1) – this despite the general and well-known analytic weakness of dichotomous items (Bollen and Barb 1981, Nowak 2019).

That is the effect of someone staying overnight at *your* place. The effect of your sleeping over at *someone else's place* is about the same (Figure 2). It more than doubles the risk from 17% to something around 40% or 45%. It is therefore sensible to dichotomize that item between "no" (scored 0) and "some overnighting" (scored 1).

[Figure 2 about here]

Title: Figure 2. Your staying overnight at someone else's place increases your risk of getting the new coronavirus. US adults 2020, May through September; N= 7,130.

Proportion infected	You stay overnight at someone else's house?
.19	No
.41	Yes, just for a night or two
.46	Yes, for many nights at one person's house
.48	Several nights at different people's houses
.48	Quite a few nights at different people's houses

For reliability and parsimony in the analysis that follows we average the two "overnighting" items in those surveys where both were asked. (In the two early surveys where only the one question was asked, we use it alone.) This gives a reliable scale (Cronbach's alpha= .89):

Overnighting scale	
35%	No overnighting (scored 0);
10%	Others overnight with you or you with others, but not both (0.5)
55%	Others overnight with you and you overnight with others (scored 1)
(Total 100%; 6,896 cases)	

OVERNIGHTING, DAYTIME DISTANCING, AND CORONAVIRUS

People who let others stay overnight, or who themselves stay overnight at somebody else's place, or do both, are much less careful about social distancing during the day (Figure 3, column 2, in green; the signs are negative because the more distancing you

do, the less likely you are to overnight). Overnigheters are less likely to stay 6 feet away from strangers in public ($r = -.30$); less likely to avoid shaking hands ($r = -.46$); less likely to wash their hands after being out in public ($r = -.44$); or to avoid visiting during the day ($r = -.30$).

[Figure 3 about here]

Title: Figure 3. Correlations between self-reports of having had COVID-19 (col. 1, in red), overnighing (col. 2, in green), and conventional distancing behaviors (blue highlight). US adults 2020, April through September; $N = 8,937$.

	Infected (1)	Overnight (2)	6 feet (3)	Shake (4)	Wash (5)	Visit (6)	Mask (7)
<u>Overnighing</u>	0.3560	1.0000					
<u>Conventional distancing:</u>							
Stay 6 feet away	-0.2122	-0.2954	1.0000				
Not shake hands	-0.2751	-0.4643	0.5369	1.0000			
Wash hands	-0.3125	-0.4439	0.5191	0.5769	1.0000		
Not visit	-0.1801	-0.2995	0.4224	0.4580	0.4469	1.0000	
Wear mask	-0.1957	-0.2659	0.4495	0.4422	0.4927	0.3683	1.0000
<u>Distancing scale</u>	-0.3104	-0.4755	0.7542	0.8038	0.7923	0.7588	0.5713

The connection between the daytime distancing scale combining these different precautions and overnighing is an impressive $-.48$. Thus, their behavior is more risky during the day as well as during the night.

Just which daytime distancing measures are the best protection, and for whom, is a fraught question, since distancing in one way (for example, staying at least 6 feet away) is strongly correlated with taking precautions in other ways (for example not shaking hands (Figure 3, figures highlighted in blue). In this example the correlation is $r = .54$ (column 3, second line of the "Daytime distancing" panel). So, it is statistically difficult to say which of these highly correlated distancing precautions makes for safety and by how much.

Fortunately for our issues we do not need to know the details, just the overall outcome. For that we can combine the distancing precautions, simply averaging them into a single (highly reliable) distancing scale (Figure 3, last row). In the analyses that follow, we use the scale because taking the five items separately does not add any statistically significant information.

The daytime distancing scale combining these different precautions has a strong bivariate connection with overnighing: The correlation is an impressive $-.48$. Thus, overnigheters' behavior is more risky during the day as well as during the night.

Subject to the many uncertainties in our self-reported measure of having been infected, this strongly suggests that daytime distancing behavior vastly reduces the

chance of catching the new coronavirus. Someone who never distances at all – no 6 feet away, no washing hands, always shaking hands, never avoiding parties or visits – but is otherwise average has a probability of .59 of getting infected. But if they instead distanced faithfully and consistently – always staying 6 feet apart, always washing hands regularly, never shaking hands, never going to parties, never visiting – their probability of getting coronavirus would be only .26. So such extreme distancing reduces the probability of infection by fully .33 points (viz $.26 - .59 = -.33$). ; Figure 4, second row, first column Panel 1, in red). The 95% confidence intervals for these estimates are .23 to .29 for never social distancing and .55 to .63 for always social distancing. This is a vast difference, amply justifying the familiar and unequivocal medical and public policy recommendations in favor of distancing.

[(Figure4 about here)]

Title: Figure 4. Influences of overnighting and social distancing behavior on self-reports of having had COVID-19. OLS regression estimates. N= 7,765 US adults in 2020, April through September.

	Probability of infection	
	Metric (1)	Standardized (2)

1. Distancing: Night & Day		
Overnighting	0.18***	0.23***
Distancing scale	-0.33***	-0.17***
2. Controls:		
Male (0 or 1)	-0.02**	-0.03**
Black (0 or 1)	0.04***	0.04***
Hispanic/Latinx (0 or 1)	0.03	0.02
Education (years)	0.00	0.02
Occupational status (SIOM, 0 to 100)	0.04*	-0.02*
Family income ('000s)	0.01	0.01
Age 20-24 (0 or 1)	-0.02	-0.02
Age 25-29 (0 or 1)	0.00	0.00
Age 30-34 (0 or 1)	0.03**	0.03*
Democratic vote intention (0 to 1)	0.01	0.01
Risk seeker (0 to 1)	0.18***	0.12***
(Intercept)	0.34***	

(R-squared)	0.177	

* p<0.05, ** p<0.01, *** p<0.001		

This is the recommended, sometimes mandated, behavior that medical experts and policy makers talk about publicly. But they are strangely silent about the even stronger effect of overnighting on COVID-19 risk (Figure 4, column 2, standardized

regression coefficients). On average, overnighing raises your coronavirus infection risk by 18 percentage points (metric regression coefficient in Column 1) ! Moreover, that is a very tight connection: People's experiences are typically close to this prediction. Indeed, this is the tightest connection among all those in the model, as shown by the standardized regression coefficient of 0.23, substantially the strongest in the model (Column 2).

DISTANCING AT NIGHT

Many of the benefits of daytime distancing can be undone at night (Figure 4, first row and first column in the first panel, in green). This is again subject to the many uncertainties in our self-reported measure of having been infected.

Everything else equal (including daytime distancing) someone who never has overnight visitors, and never visits overnight themselves, has a probability of just .24 of getting infected (95% confidence band .21 to .27). But if they have overnight visitors, and themselves visit overnight from time to time, the probability of infection rises to .42 (confidence band .39 to .45), a difference of .18 (viz $.42 - .24 = .18$). That is a large difference, over half the difference due to the full suite of all the daytime social distancing behaviors.

So, night is a risky time.

As far as practical policy initiatives at this stage of the coronavirus pandemic (through September), the night matters at least as much as the day (Figure 4, standardized results in column 2, first two rows: green for overnighing and red for daytime distancing). These standardized regression coefficients compare the estimated impact of a one standard deviation change in overnighing to a one standard deviation change in daytime social distancing.

By that measure overnighing is at least as important as daytime distancing, .23 versus -.17 (that one is positive and the other negative is irrelevant here, just reflecting choice of labels).

The substance behind this is that daytime distancing is *already* very widely practiced, averaging around .75 on a scale of 0 to 1. So, there is not all that much room for further improvement. But night-time distancing is, by contrast, currently around the midpoint on the 0 to 1 scale, so there is still a lot of room for change, for better (from a public health point of view) or for worse.

WHO OVERNIGHTS?

Who overnights? The short answer is, "Lots of people!" This varies greatly by age, but there are many overnighers in all age groups (Figure 5).

Overnighing is most common among young adults . Overnighing starts abruptly in the early 20s, reaches its peak near 30, and then declines steadily (but not abruptly) through the 40s and 50s. In more detail, about half of people in their early 20s are having overnight guests and about half are overnighing at other people's homes (some

people do both, some do not). That rises to over 60% through the late 20s and early 30s, then declines steadily, but not especially quickly across the rest of the life span, so that even at age 70, about one third are having overnight guests and about one third are overnighing at other people's homes.

[Figure 5 about here]

Title: Figure 5. Overnighing is common and there are large age differences. Bivariate relationships of age with (1) others overnighing at your place and (2) you overnighing at other people's homes. April-September 2020. N= 7765 (others in your home) and N=4815 (you at others' homes).

The big peak of visits in the 20s and 30s are likely to be romantic, for the most part. Of course not all overnight visits are romantic. Some will be relatives; some will be friends; some friends of one's children, dates of one's housemates, and so on.

In addition to the striking age profile, there is another way in which overnighers are distinctive: They are very willing to take risks (Figure 6, figures highlighted in blue). This is a general risk tolerance – taking risks in driving, in financial matters, and at work, as measured in (Dohmen et al. 2011). Very risk averse people (0 on the 0 to 10 scale) typically have only a 12% chance of having been infected, all else equal. But if they are risk-seekers (10 on the 0 to 10 scale, they have an 51% chance of having been infected ($t=223$, $p<.0001$). That is a huge difference.

[Figure 6 about here]

Title: Figure 6. Influences on overnighting (combined scale): Background, age, and willingness to take risks. OLS multiple regression. N=7,798 US adults

Overnighting (scale, 0-1)		
	Metric (1)	Standardized (2)
Male (0 or 1)	0.03**	0.03**
Black (0 or 1)	0.09***	0.08***
Hispanic/Latinx (0 or 1)	0.01	0.00
Education (years)	0.00	0.01
Occupational status (SIOM, 0 to 100)	0.06**	0.03**
Family income ('000s)	-0.00	-0.01
Age 20-24 (0 or 1)	0.15***	0.10***
Age 25-29 (0 or 1)	0.11***	0.09***
Age 30-34 (0 or 1)	0.08***	0.07***
Democratic vote intention (0 to 1)	-0.12***	-0.09***
Risk seeker (0 to 1)	0.76***	0.41***
(Intercept)	0.34***	
R-squared		0.237
* p<0.05, ** p<0.01, *** p<0.001		

Apart from age and risk tolerance, there are, at most, weak differences in overnighting. All else equal, men are only fractionally more likely than women to have overnighted. Blacks are 9% more likely to have overnighted, a significant difference from Whites ($p<.001$). Hispanics are not significantly different. There are no significant differences between the well educated and those with little schooling, but people with high status jobs (higher professionals and high ranking managers) are 6% more likely to overnight than are those at the bottom of the status hierarchy (farm workers; $p<.01$). Prosperous people are no different than otherwise comparable poor folk. Democrats are 12% less likely than Republicans to overnight ($p<.001$).

POLICY: ALLOW OVERNIGHTING DURING THE EPIDEMIC?

After a series of questions about laws enforcing other distancing policies for Americans in general, we asked specifically about young people dating. The state of opinion through September 2020, many months into the pandemic is this:

How about young people, in their 20s and 30s. Considering the way the coronavirus epidemic has developed up to this week, do you think they should NOW BE ALLOWED....

To go on DATES with new partners?

17%	Definitely should be allowed at present	(scored 100)
29%	Probably should be	(scored 75)
21%	Mixed feelings, not sure	(scored 50)
18%	Probably not allowed	(scored 25)
15%	Definitely not allowed at present	(scored 0)
(Total 100%; 9,439 cases. Mean 54 points out of 100)		

Opinion on dating is almost evenly divided (as of September 2020). Many support the idea – close to a majority – while almost as many oppose it, and quite few have mixed feelings. If it had come to a simple yes or no vote, allowing dating would probably have carried the day by a narrow margin (the mean is 54 points out of 100, a little above the 50-50 half way point of "Mixed feelings, not sure").

Thus if we assume that allowing dating in modern America at least implicitly allows for the possibility of eventually spending the night together, this means that there is no strong public support for banning romantic overnight visiting. This is in sharp contrast to opinion on other social distancing measures where the mean averages 68, approaching "probably should be required by law".

Moreover, support for dating is increasing by nearly one point per week, rising from around 46 in the epidemic's early peak in April to 62 in September ($t=15.9$, $p<.001$). This is net of changes in SES and a slow decline in support for daytime distancing (from 79 to 72 points out of 100; regression analysis not shown).

So public health prescriptions to make nights safer from coronavirus face an uphill battle, and one on present trends likely to get harder as time goes on.

DISCUSSION

Summary

The results show that overnighting is widespread in American society, even throughout the pandemic thus far, with more than half of adult Americans having at least one overnight guest in the past month and a similar number having slept over in another home. Almost two-thirds, 63%, did at least one of these things. Regression analysis shows that it is widely diffused socially, with no difference by education, income, or Hispanic ethnicity, and only small differences by political party preference, occupational status, and race. There is a very large and strong difference according to general risk aversion: Risk seekers are enormously more likely to overnight than are their risk-averse peers. Age also matters a lot: Adults in their 20s and early 30s overnight much more than do otherwise similar people who are older.

The results also show that this is very consequential for catching COVID-19. People who overnight even just once a month more than double their risk of self-reported COVID.

Further, mobilizing social support for policies to reduce overnighting would be difficult as we also find minority support for policies to discourage young people from going on dates with new partners. Moreover, this support is dwindling over time, so reversing that trend might be an uphill battle.

Implications

An important consequence of spending the night together is that even complete compliance with the conventional daytime social distancing policies will not be enough to halt the spread of the new coronavirus.

Although overnighting is less common among people who consistently and scrupulously follow daytime social distancing recommendations, it is far from absent. Even among people who consistently follow ALL the daytime social distancing restrictions, some 24% nonetheless have others stay overnight (often several people and many nights) or themselves sleep over at other people's homes (22%) often for many nights, sometimes with several different people over the course of the month. 25% do one of these or the other and 20% do both. These are long-lasting intimate contacts, often in the same bed, are ideal for spreading coronavirus.

[Figure 7 about here]

Title: Figure 7. Percent overnighting among those who follow all daytime social distancing policies without exception: Overnighting still leaves many exposed to numerous, prolonged, and intimate contacts at night. 2020, April through September. US Adults. (Ns below.)

Panel 1. Anyone staying here overnight in the last month?

77%	No, nobody
8%	Yes, one person did but just for a night or two
6%	Yes, one person stayed for many nights
5%	Several different people stayed for a night or two
3%	Different people stayed for quite a few nights
1%	Lots of different people were here overnight

(Total 100%; 1,157 respondents who always daytime social distance)

Panel 2. You stay overnight at someone else's house? [a]

78%	No
9%	Yes, just for a night or two
8%	Yes, for many nights at one person's house
4%	Several nights at different people's houses
2%	Quite a few nights at different people's houses

(Total 100%; 725 respondents who always daytime social distance)

[a] Question not asked In the first two waves of the survey.

The policy implications of these results emphasize reaching out to younger adults and risk-seekers specifically about overnighting, rather than hoping they will infer it from

recommendations against “visiting”. Well publicized testimonials from “cool” younger adults who are demonstrably risk-seekers (e.g. well known practitioners of extreme sports) and who caught COVID talking about how they thought they would not get it and how shocked they were when they got it might be among the tactics to deploy here.

An alternative public health policy, less controversial given the broad spectrum of American attitudes about sex, would focus on harm minimization, encouraging (or requiring) overnights to promptly test themselves for infection and then self-quarantine if infected.

REFERENCES

- Azlan, Arina A., Mohammad R. Hamzah, Tham J. Sern, Suffian H. Ayub and Emma Mohamad. 2020. "Public Knowledge, Attitudes and Practices Towards Covid-19: A Cross-Sectional Study in Malaysia." *PLoS One* May 21, 2020:<https://doi.org/10.1371/journal.pone.0233668>. .
- Berk, Richard A. 1983. "An Introduction to Sample Selection Bias in Sociological Data." *American Sociological Review* 48(3):386-98.
- Bollen, Kenneth A. and Kenney H. Barb. 1981. "Pearson's R and Coarsely Categorized Measures." *American Sociological Review* 46(2):232-39. doi: 10.2307/2094981.
- Bollen, Kenneth A. 1989. "Confirmatory Factor Analysis." Pp. 226-318 in *Structural Equations with Latent Variables*: Wiley-Interscience.
- Carifio, James and Rocco J. Perla. 2007. "Ten Common Misunderstandings, Misconceptions, Persistent Myths and Urban Legends About Likert Scales and Likert Response Formats and Their Antidotes." *Journal of Social Sciences* 3(3):106–16.
- CDC. 2020, "Social Distancing, July 15, 2020", Atlanta: US Government. Retrieved August 28, 2020 (<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html>).
- Clifford, Scott, Ryan M Jewell and Philip D Waggoner. 2015. "Are Samples Drawn from Mechanical Turk Valid for Research on Political Ideology." *Research & Politics* 2(4):doi:10.1177/2053168015622072.
- Cornesse, Carina and Annelies G. Blom. 2020. "Response Quality in Nonprobability and Probability-Based Online Panels." *Sociological Methods & Research* online first: <https://doi.org/10.1177/0049124120914940>.
- Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp, Gert G. Wagner. 2011. "Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey." *Journal of the European Economic Association* 9 (3):522-50. doi: <https://doi.org/10.1111/j.1542-4774.2011.01015.x>.
- Eagle, Jeremy. 2020. "How Has the Coronavirus Changed How You Use the Internet?" Pp. <https://www.nytimes.com/2020/04/09/learning/how-has-the-coronavirus->

- changed-how-you-use-the-internet.html in *New York Times*. New York City: New York Times.
- Evans, MDR and Jonathan Kelley. 2011. "US Attitudes Towards Human Embryonic Stem Cell Research." *Nature Biotechnology* 29(6):484-88. doi: 10.1038/nbt.1891.
- Gershuny, Jonathan, Oriel Sullivan, Almudena Sevilla, Marga Vega-Rapun, Francesca Foliano, Juana Lamote De Grignon and Teresa HarmsPierre Walther. 2020. "A New Perspective from Time Use Research on the Effects of Lockdown on Covid-19 Behavioral Infection Risk." *SocArXiv* 2020 September(4): <https://doi.org/10.31235/osf.io/feguj>.
- Graham, Amanda, Francis T. Cullen, Justin T. Pickett, Cheryl Lero Jonson, Murat Haner and Melissa M. Sloan. 2020. "Faith in Trump, Moral Foundations, and Social Distancing Defiance During the Coronavirus Pandemic." *Socius* 6(September 10, 2020):<https://doi.org/10.1177/2378023120956815>
- Hossain, Mohammed Mahbub. 2020. "Current Status of Global Research on Novel Coronavirus Disease (Covid-19): A Bibliometric Analysis and Knowledge Mapping." *SSRN*: <https://ssrn.com/abstract=3547824> 2020(May 18):<http://dx.doi.org/10.2139/ssrn.3547824>.
- Hou, Tianya, Taiquan Zhang, Wenpeng Cai, Xiangrui Song, Aibin Chen, Guanghui Deng and Chunyan Ni. 2020. "Social Support and Mental Health among Health Care Workers During Coronavirus Disease 2019 Outbreak: A Moderated Mediation Model." *PLoS One* May 29, 2020:<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233831>. doi: 10.1371/journal.pone.0233831.
- Imhoff, Roland and Pia Lamberty. 2020. "A Bioweapon or a Hoax? The Link between Distinct Conspiracy Beliefs About the Coronavirus Disease (Covid-19) Outbreak and Pandemic Behavior." *Social Psychological and Personality Science* in press:forthcoming.
- Lehmiller, Justin J., Justin R. Garcia, Amanda N. Gesselman and Kristen P. Mark. 2020. "Less Sex, but More Sexual Diversity: Changes in Sexual Behavior During the Covid-19 Coronavirus Pandemic." *Leisure Sciences* June 26, 2020:<https://doi.org/10.1080/01490400.2020.1774016>. doi: DOI: 10.1080/01490400.2020.1774016.
- Likert, Rensis. 1932. "A Technique for the Measurement of Attitudes." *Archives of Psychology, Health & Medicine* 22(1):5-55.
- Manzo, Gianluca. 2020. "Complex Social Networks Are Missing in the Dominant Covid-19 Epidemic Models." *Sociologica* 14(1):31-49, <<https://sociologica.unibo.it/article/view/10839>>. doi: <https://doi.org/10.6092/issn.1971-8853/10839>.
- Matthewman, Steve and Kate Huppertz. 2020. "A Sociology of Covid-19." *Journal of Sociology* online before print:10.1177/1440783320939416. doi: 10.1177/1440783320939416.
- McFadden, SarahAnn M., Aryn A. Malik, Obianuju G. Aguolu, Kathryn S. Willebrand and Saad B. Omer. 2020. "Perceptions of the Adult US Population Regarding the Novel Coronavirus Outbreak." *PLoS One* 15(4):e0231808. doi: <https://doi.org/10.1371/journal.pone.0231808>.

- Melbin, Murray. 1978. "Night as Frontier." *American Sociological Review* 43(1):3-22.
- Nowak, Piotr B. 2019. "Moment-Type Estimation from Grouped Samples." *Statistics & Probability Letters* 149(June):80-85. doi: 10.1016/j.spl.2019.01.010.
- Pennycook, Gordon, Jonathon McPhetres, Bence Bago and David G. Rand. 2020, April 14. "Predictors of Attitudes and Misperceptions About Covid-19 in Canada, the Uk, and the USA." edited by U. o. R. C. Hill/Levene Schools of Business. Hill/Levene Schools of Business, University of Regina (Canada): files.osf.io.
- Schaeffer, Katherine. 2020. "Nearly Three-in-Ten Americans Believe Covid-19 Was Made in a Lab. ." *PEW Fact Tank*. 2020, April 8:<https://www.pewresearch.org/facttank/2020/04/08/nearly-three-in-ten-americans-believe-covid-19-was-made-in-a-lab/>.
- Springer, Victoria A., I. Stephanie Vezich, Samuel C. Lindsey and Peter J. Martini. 2016. "Practice-Based Considerations for Using Multi-Stage Survey Design to Reach Special Populations on Amazon's Mechanical Turk." *Survey Practice* 9(5):1-10.
- Treiman, Donald J. 2009. "Scale Construction." Pp. 241-62 in *Quantitative Data Analysis*. San Francisco: Jossey-Bass.
- Varshney, Mohit, Jithin T. Parel, Neeraj Raizada and Shiv K. Sarin. 2020. "Initial Psychological Impact of Covid-19 and Its Correlates in Indian Community: An Online (Feel-Covid) Survey. ." *PLoS One* 15(5)(5):e0233874. doi: <https://doi.org/10.1371/journal.pone.0233874>.
- Wang, Huiyao, Qian Xia, Zhenzhen Xiong, Zhixiong Li, Weiyi Xiang, Yiwen Yuan, Yaya Liu and Zhe Li. 2020. "The Psychological Distress and Coping Styles in the Early Stages of the 2019 Coronavirus Disease (Covid-19) Epidemic in the General Mainland Chinese Population: A Web-Based Survey." *PLoS One* 15(5):e0233410. doi: <https://doi.org/10.1371/journal.pone.0233410>.
- Weinberg, Jill D., Jeremy Freese and David McElhattan. 2014. "Comparing Data Characteristics and Results of an Online Factorial Survey between a Population-Based and a Crowdsourcing-Recruited Sample." *Sociological Science* 1(1):292-310.
- Yan, Youpei, Aryn A Malik, Jude Bayham, Eli P Fenichel, Chandra Couzens and Saad B Omer. 2020. "Measuring Voluntary and Policy-Induced Social Distancing Behavior During the Covid-19 Pandemic." Pp. Posted August 01, 2020. in *medRxiv: COVID-19 SARS-CoV-2 preprints* August 2020(01) doi: <https://doi.org/10.31235/osf.io/hzj7a>.
- Zerubavel, Eviatar. 1985. *Hidden Rhythms: Schedules and Calendars in Social Life*. Berkeley and Los Angeles: University of California Press.