

Appendix S1. Schizophrenia vignette.

XX is 44 years old. He/she is staying in a 1-room HDB rental flat. He/she has not worked for years. He/she wears the same clothes every day and has left his/her hair to grow long and untidy. He/she is always on his/her own and is often seen sitting in the park talking to himself/herself. Sometimes, he/she stands and moves his/her hands as if to communicate to someone in nearby trees. He/she rarely drinks alcohol. At times, he/she accuses shopkeepers of giving information about him/her to other people. He/she has put extra locks on his/her door. He/she says spies are watching him/her all the time. His/her neighbours complain that he/she does not clean his/her room, which is becoming increasingly dirty and is filled with glass objects. XX says he/she is using these "to receive messages from space".

Vignette-related questionnaires

2.1 Recognition of schizophrenia

Statement: What do you think [XX] is suffering from?

Response: Open text

2.2 Personal Stigma Scale of Depression Stigma Scale

The next question contains statements about [XX]'s problem. Please indicate how strongly you agree or disagree with each statement.

Statement:

- a. People with a problem like [XX]'s could get better if they wanted to.
- b. A problem like [XX]'s is a sign of personal weakness.
- c. [XX]'s problem is not a real medical illness.
- d. People with a problem like [XX]'s are dangerous to others.
- e. It is best to avoid people with a problem like [XX]'s so that you don't also get this problem.
- f. People with a problem like [XX]'s are unpredictable.
- g. If I had a problem like [XX]'s I would not tell anyone.
- h. I would not employ someone if I knew they had a problem like [XX]'s.

Response:

- 1. Strongly agree
- 2. Agree
- 3. Neither agree nor disagree
- 4. Disagree
- 5. Strongly disagree
- 6. Not applicable (if volunteered or not old enough to employ someone) - for statement h only
- 7. Don't know
- 8. Refused

2.3 Social Distance Scale

How willing would you have contact with someone like [XX]?

Statement

- a. How willing would you be to move next door to [XX]?
- b. How willing would you be to spend an evening with [XX]?
- c. How willing would you be to make friends with [XX]?
- d. How willing would you be to have [XX] start working closely with you on a job?
- e. How willing would you be to have [XX] marry into your family?

Response

- 1. Definitely willing
- 2. Probably willing
- 3. Probably unwilling
- 4. Definitely unwilling
- 5. Don't know
- 6. Refused

Table S1. Pooled survey-weighted logistic regression on changes of correct schizophrenia recognition over time with survey year as the key predictor and all sociodemographic variables as covariates.

	OR	95% CI	t	<i>P</i>
Survey year (ref: 2015)				
2023	0.97	0.54–1.74	−0.11	0.911
Age group (ref: 18–34 years)				
35–49 years	0.37	0.16–0.85	−2.35	0.019
50–65 years	0.31	0.09–1.04	−1.90	0.058
Sex (ref: Female)				
Male	0.57	0.27–1.22	−1.45	0.148
Ethnicity (ref: Chinese)				
Malay	0.87	0.39–1.97	−0.33	0.741
Indian	0.85	0.43–1.69	−0.46	0.645
Others	0.40	0.10–1.53	−1.34	0.180
Marital status (ref: Married)				
Never married	1.31	0.57–2.98	0.64	0.525
Sep/Divorced/Widowed	3.94	0.73–21.31	1.59	0.112
Education (ref: University)				
Primary & below	0.04	0.002–0.72	−2.18	0.030
Secondary	0.49	0.10–2.36	−0.88	0.377
Pre-U/Diploma/Poly	0.89	0.28–2.82	−0.19	0.848
Employment (ref: Employed)				
Unemployed	7.83	1.54–39.84	2.48	0.013
Economically inactive	1.59	0.39–6.54	0.64	0.520
Income (ref: >SGD10,000)				
<SGD2000	0.27	0.05–1.53	−1.48	0.139
SGD2000–3999	0.11	0.02–0.45	−3.06	0.002
SGD4000–5999	0.14	0.03–0.56	−2.78	0.006
SGD6000–9999	0.34	0.09–1.23	−1.65	0.100
Contact experience (ref: No)				
Personal experience: Yes	0.03	0.003–0.42	−2.64	0.009
Family/friends exp: Yes	3.54	1.32–9.50	2.51	0.012

CI: confidence interval; OR: odds ratio; SGD: Singapore dollars

Reference categories: 2015 (time); 18–34 years (age); female (sex); Chinese (ethnicity); married (marital); university (education); employed (employment); >SGD10,000 (income); no (contact experience).

Table S2. Pooled survey-weighted linear regression on “weak-not-sick” stigma with survey year as the key predictor and all sociodemographic variables as covariates.

	β	95% CI	t	P
Survey year (ref: 2015)				
2023	−0.65	−0.99 to −0.31	−3.78	<0.001
Age group (ref: 18–34 years)				
35–49 years	0.74	0.12–1.36	2.35	0.019
50–65 years	1.42	0.74–2.10	4.09	<0.001
Sex (ref: Female)				
Male	0.31	−0.15 to 0.77	1.33	0.184
Ethnicity (ref: Chinese)				
Malay	0.37	−0.08 to 0.83	1.61	0.107
Indian	0.35	−0.09 to 0.78	1.57	0.116
Others	−0.67	−1.38 to 0.03	−1.88	0.061
Marital status (ref: Married)				
Never married	−0.31	−0.94 to 0.32	−0.96	0.335
Sep/Divorced/Widowed	−0.12	−0.93 to 0.68	−0.30	0.766
Education (ref: University)				
Primary & below	0.90	−0.12 to 1.92	1.73	0.083
Secondary	0.66	0.04–1.28	2.08	0.038
Pre-U/Diploma/Poly	0.19	−0.42 to 0.79	0.61	0.539
Employment (ref: Employed)				
Unemployed	−1.35	−2.60 to −0.11	−2.13	0.034
Economically inactive	0.01	−0.73 to 0.74	0.01	0.989
Income (ref: >SGD10,000)				
<SGD2000	1.35	0.33–2.37	2.59	0.010
SGD2000–3999	1.47	0.41–2.54	2.71	0.007
SGD4000–5999	1.22	0.24–2.21	2.44	0.015
SGD6000–9999	0.80	−0.17 to 1.77	1.62	0.106
Contact experience (ref: No)				
Personal experience: Yes	0.95	0.12–1.78	2.25	0.024
Family/friends exp: Yes	−0.36	−0.86 to 0.15	−1.39	0.164

CI: confidence interval; SGD: Singapore dollars

β = unstandardised regression coefficient

Table S3. Pooled survey-weighted linear regression on “dangerous-unpredictable” stigma with survey year as the key predictor and all sociodemographic variables as covariates.

	β	95% CI	t	P
Survey year (ref: 2015)				
2023	−0.35	−0.77, 0.06	−1.67	0.096
Age group (ref: 18–34 years)				
35–49 years	0.02	−0.73, 0.78	0.06	0.951
50–65 years	0.10	−0.75, 0.95	0.23	0.817
Sex (ref: Female)				
Male	0.48	−0.01, 0.97	1.92	0.055
Ethnicity (ref: Chinese)				
Malay	−0.13	−0.69, 0.42	−0.46	0.642
Indian	−0.39	−0.87, 0.09	−1.59	0.111
Others	−0.40	−1.19, 0.39	−0.98	0.326
Marital status (ref: Married)				
Never married	−0.38	−1.07, 0.31	−1.08	0.279
Sep/Divorced/Widowed	−0.77	−1.80, 0.25	−1.48	0.139
Education (ref: University)				
Primary & below	0.53	−0.86, 1.92	0.75	0.451
Secondary	0.04	−0.80, 0.87	0.09	0.930
Pre-U/Diploma/Poly	−0.44	−1.09, 0.22	−1.31	0.191
Employment (ref: Employed)				
Unemployed	−0.79	−1.88, 0.30	−1.43	0.154
Economically inactive	−0.67	−1.50, 0.16	−1.60	0.111
Income (ref: >SGD10,000)				
<SGD2000	2.29	1.09, 3.48	3.75	<0.001
SGD2000–3999	1.27	0.13, 2.41	2.19	0.029
SGD4000–5999	2.09	1.02, 3.17	3.81	<0.001
SGD6000–9999	1.28	0.09, 2.47	2.11	0.035
Contact experience (ref: No)				
Personal experience: Yes	1.27	−0.04, 2.57	1.91	0.057
Family/friends exp: Yes	−0.35	−0.95, 0.25	−1.14	0.255

CI: confidence interval; SGD: Singapore dollars

β = unstandardised regression coefficient

Table S4. Pooled survey-weighted linear regression on social distance stigma with survey year as the key predictor and all sociodemographic variables as covariates.

	β	95% CI	t	P
Survey year (ref: 2015)				
2023	+0.03	−0.56 to 0.61	0.08	0.933
Age group (ref: 18–34 years)				
35–49 years	0.69	−0.18 to 1.56	1.56	0.119
50–65 years	0.02	−0.96 to 1.01	0.05	0.961
Sex (ref: Female)				
Male	0.23	−0.42 to 0.88	0.70	0.485
Ethnicity (ref: Chinese)				
Malay	−1.55	−2.27 to −0.83	−4.22	<0.001
Indian	−1.30	−1.92 to −0.68	−4.11	<0.001
Others	−1.08	−1.94 to −0.21	−2.44	0.015
Marital status (ref: Married)				
Never married	−0.03	−0.85 to 0.80	−0.06	0.952
Sep/Divorced/Widowed	−1.02	−2.52 to 0.47	−1.34	0.179
Education (ref: University)				
Primary & below	0.58	−1.67 to 2.83	0.51	0.613
Secondary	−1.00	−2.14 to 0.15	−1.71	0.088
Pre-U/Diploma/Poly	−0.63	−1.45 to 0.19	−1.50	0.133
Employment (ref: Employed)				
Unemployed	0.61	−1.62 to 2.84	0.54	0.589
Economically inactive	−0.91	−2.38 to 0.55	−1.22	0.222
Income (ref: >SGD10,000)				
<SGD2000	1.04	−0.69–2.77	1.18	0.237
SGD2000–3999	0.28	−1.21 to 1.76	0.37	0.715
SGD4000–5999	0.17	−1.18 to 1.52	0.25	0.803
SGD6000–9999	0.15	−1.33 to 1.63	0.20	0.845
Contact experience (ref: No)				
Personal experience: Yes	0.02	−1.68 to 1.73	0.03	0.978
Family/friends exp: Yes	−1.39	−2.11 to −0.68	−3.82	<0.001

CI: confidence interval; SGD: Singapore dollars

β = unstandardised regression coefficient

Table S5. Doubly robust IPW logistic regression on correct schizophrenia recognition.

	OR	95% CI	t	<i>P</i>
Survey year (ref: 2015)				
2023	1.24	0.65–2.37	0.66	0.512
Age group (ref: 18–34 years)				
35–49 years	0.37	0.16–0.85	–2.35	0.019
50–65 years	0.31	0.09–1.04	–1.90	0.058
Sex (ref: Female)				
Male	0.57	0.27–1.22	–1.45	0.148
Ethnicity (ref: Chinese)				
Malay	0.87	0.39–1.97	–0.33	0.743
Indian	0.85	0.43–1.69	–0.46	0.645
Others	0.40	0.10–1.54	–1.34	0.180
Marital status (ref: Married)				
Never married	1.31	0.57–2.98	0.64	0.524
Sep/Divorced/Widowed	3.94	0.73–21.29	1.59	0.112
Education (ref: University)				
Primary & below	0.04	0.002–0.72	–2.18	0.030
Secondary	0.49	0.10–2.36	–0.89	0.376
Pre-U/Diploma/Poly	0.89	0.28–2.81	–0.19	0.847
Employment (ref: Employed)				
Unemployed	7.81	1.54–39.70	2.48	0.013
Economically inactive	1.59	0.39–6.54	0.64	0.521
Income (ref: >SGD10,000)				
<SGD2000	0.27	0.05–1.53	–1.48	0.140
SGD2000–3999	0.11	0.02–0.45	–3.06	0.002
SGD4000–5999	0.14	0.03–0.56	–2.78	0.006
SGD6000–9999	0.34	0.09–1.23	–1.64	0.101
Contact experience (ref: No)				
Personal experience: Yes	0.03	0.003–0.42	–2.63	0.009
Family/friends exp: Yes	3.54	1.32–9.49	2.51	0.012

CI: confidence interval; IPW: inverse probability weighting; OR: odds ratio; SGD: Singapore dollars

Table S6. Doubly robust IPW linear regression on “weak-not-sick” stigma.

	β	95% CI	t	P
Survey year (ref: 2015)				
2023	−0.74	−1.10 to −0.38	−4.05	<0.001
Age group (ref: 18–34 years)				
35–49 years	0.74	0.12–1.36	2.35	0.019
50–65 years	1.42	0.74–2.10	4.09	<0.001
Sex (ref: Female)				
Male	0.31	−0.15 to 0.77	1.33	0.184
Ethnicity (ref: Chinese)				
Malay	0.37	−0.08 to 0.83	1.61	0.108
Indian	0.35	−0.09 to 0.78	1.57	0.117
Others	−0.68	−1.38 to 0.03	−1.88	0.060
Marital status (ref: Married)				
Never married	−0.31	−0.94 to 0.32	−0.96	0.335
Sep/Divorced/Widowed	−0.12	−0.93 to 0.68	−0.30	0.765
Education (ref: University)				
Primary & below	0.90	−0.12 to 1.93	1.73	0.084
Secondary	0.66	0.04 to 1.28	2.08	0.038
Pre-U/Diploma/Poly	0.19	−0.42 to 0.79	0.61	0.540
Employment (ref: Employed)				
Unemployed	−1.35	−2.60 to −0.11	−2.13	0.034
Economically inactive	0.01	−0.73 to 0.74	0.01	0.988
Income (ref: >SGD10,000)				
<SGD2000	1.34	0.33–2.36	2.59	0.010
SGD2000–3999	1.47	0.41–2.54	2.71	0.007
SGD4000–5999	1.22	0.24–2.20	2.44	0.015
SGD6000–9999	0.80	−0.17 to 1.76	1.62	0.106
Contact experience (ref: No)				
Personal experience: Yes	0.95	0.12–1.78	2.25	0.024
Family/friends exp: Yes	−0.36	−0.86 to 0.15	−1.39	0.164

CI: confidence interval; IPW: inverse probability weighting; SGD: Singapore dollars
 β = unstandardised regression coefficient

Table S7. Doubly robust IPW linear regression on “dangerous-unpredictable” stigma.

	β	95% CI	t	P
Survey year (ref: 2015)				
2023	−0.54	−0.98 to −0.10	−2.40	0.017
Age group (ref: 18–34 years)				
35–49 years	0.02	−0.73 to 0.78	0.06	0.951
50–65 years	0.10	−0.75 to 0.95	0.23	0.816
Sex (ref: Female)				
Male	0.48	−0.01 to 0.97	1.92	0.055
Ethnicity (ref: Chinese)				
Malay	−0.13	−0.69 to 0.42	−0.47	0.640
Indian	−0.39	−0.87 to 0.09	−1.60	0.111
Others	−0.40	−1.19 to 0.39	−0.99	0.324
Marital status (ref: Married)				
Never married	−0.38	−1.07 to 0.31	−1.08	0.279
Sep/Divorced/Widowed	−0.77	−1.80 to 0.25	−1.48	0.139
Education (ref: University)				
Primary & below	0.53	−0.86 to 1.92	0.75	0.455
Secondary	0.04	−0.80 to 0.87	0.09	0.929
Pre-U/Diploma/Poly	−0.43	−1.09 to 0.22	−1.31	0.192
Employment (ref: Employed)				
Unemployed	−0.79	−1.89 to 0.30	−1.43	0.153
Economically inactive	−0.68	−1.51 to 0.15	−1.60	0.110
Income (ref: >SGD10,000)				
<SGD2000	2.29	1.09–3.48	3.75	<0.001
SGD2000–3999	1.27	0.13–2.41	2.19	0.029
SGD4000–5999	2.09	1.02–3.17	3.81	<0.001
SGD6000–9999	1.28	0.09–2.46	2.11	0.035
Contact experience (ref: No)				
Personal experience: Yes	1.27	−0.04 to 2.57	1.91	0.057
Family/friends exp: Yes	−0.35	−0.95 to 0.25	−1.14	0.254

CI: confidence interval; IPW: inverse probability weighting; SGD: Singapore dollars
 β = unstandardised regression coefficient

Table S8. Doubly robust IPW linear regression on social distance stigma.

	β	95% CI	t	P
Survey year (ref: 2015)				
2023	-0.19	-0.74 to 0.36	-0.69	0.492
Age group (ref: 18–34 years)				
35–49 years	0.69	-0.18 to 1.56	1.56	0.119
50–65 years	0.02	-0.96 to 1.01	0.05	0.962
Sex (ref: Female)				
Male	0.23	-0.42 to 0.88	0.70	0.485
Ethnicity (ref: Chinese)				
Malay	-1.55	-2.28 to -0.83	-4.22	<0.001
Indian	-1.30	-1.92 to -0.68	-4.11	<0.001
Others	-1.08	-1.94 to -0.21	-2.45	0.015
Marital status (ref: Married)				
Never married	-0.03	-0.85 to 0.80	-0.06	0.952
Sep/Divorced/Widowed	-1.02	-2.52 to 0.47	-1.34	0.179
Education (ref: University)				
Primary & below	0.58	-1.67 to 2.83	0.50	0.614
Secondary	-1.00	-2.14 to 0.15	-1.71	0.087
Pre-U/Diploma/Poly	-0.63	-1.45 to 0.19	-1.50	0.133
Employment (ref: Employed)				
Unemployed	0.61	-1.62 to 2.84	0.54	0.590
Economically inactive	-0.91	-2.38 to 0.55	-1.23	0.221
Income (ref: >SGD10,000)				
<SGD2000	1.04	-0.68 to 2.77	1.19	0.235
SGD2000–3999	0.28	-1.20 to 1.76	0.37	0.713
SGD4000–5999	0.17	-1.17 to 1.52	0.25	0.802
SGD6000–9999	0.15	-1.33 to 1.63	0.20	0.842
Contact experience (ref: No)				
Personal experience: Yes	0.03	-1.68 to 1.74	0.03	0.976
Family/friends exp: Yes	-1.39	-2.11 to -0.68	-3.83	<0.001

CI: confidence interval; IPW: inverse probability weighting; SGD: Singapore dollars
 β = unstandardised regression coefficient

Table S9. Covariate balance before and after IPW.

Covariate	MM2015 %	MM2023 %	SMD before IPW	SMD after IPW
Sex				
Female	46.4	48.5	0.04	0.07
Age group				
18–34 years	35.1	32.0	–0.07	–0.03
35–49 years	31.3	31.1	0.00	0.01
Ethnicity				
Malay	12.9	13.0	0.00	–0.03
Indian	9.2	9.3	0.00	–0.08
Others	3.2	3.4	0.01	0.03
Marital status				
Married	64.2	63.5	–0.02	–0.03
Separated/Divorced/ Widowed	6.1	6.6	0.02	0.02
Education				
Primary & below	15.0	4.0	–0.38†	–0.11
Secondary	25.9	20.3	–0.13	0.00
Pre-U/Diploma/Poly	29.7	28.8	–0.02	–0.03
Employment				
Unemployed	4.0	3.6	–0.02	–0.05
Economically inactive	15.9	11.2	–0.14	–0.21‡
Personal income (SGD)				
2000–3999	33.0	24.5	–0.19	0.03
4000–5999	15.9	22.4	0.17	–0.05
6000–9999	8.5	14.7	0.20	–0.09
>10,000	3.1	9.1	0.26†	–0.07
Contact experience				
Personal experience: Yes	6.2	4.4	–0.08	0.06
Family/friends exp: Yes	14.2	18.8	0.12	0.06

IPW: inverse probability weighting; SMD: standardised mean difference; SGD: Singapore dollars

† SMD≥0.10 before IPW (substantial imbalance). ‡ Residual SMD≥0.10 after IPW (see text).

Threshold for adequate balance: |SMD|<0.10.