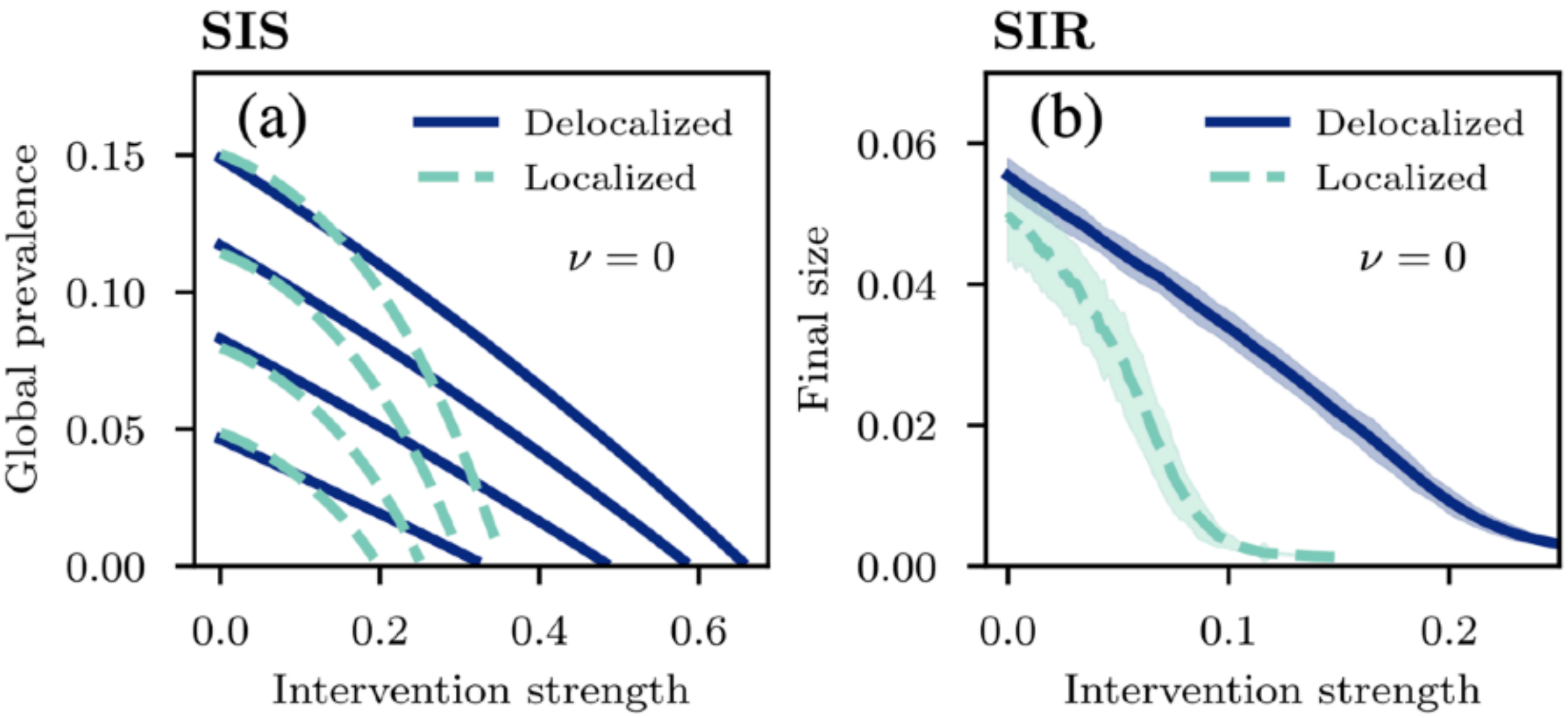
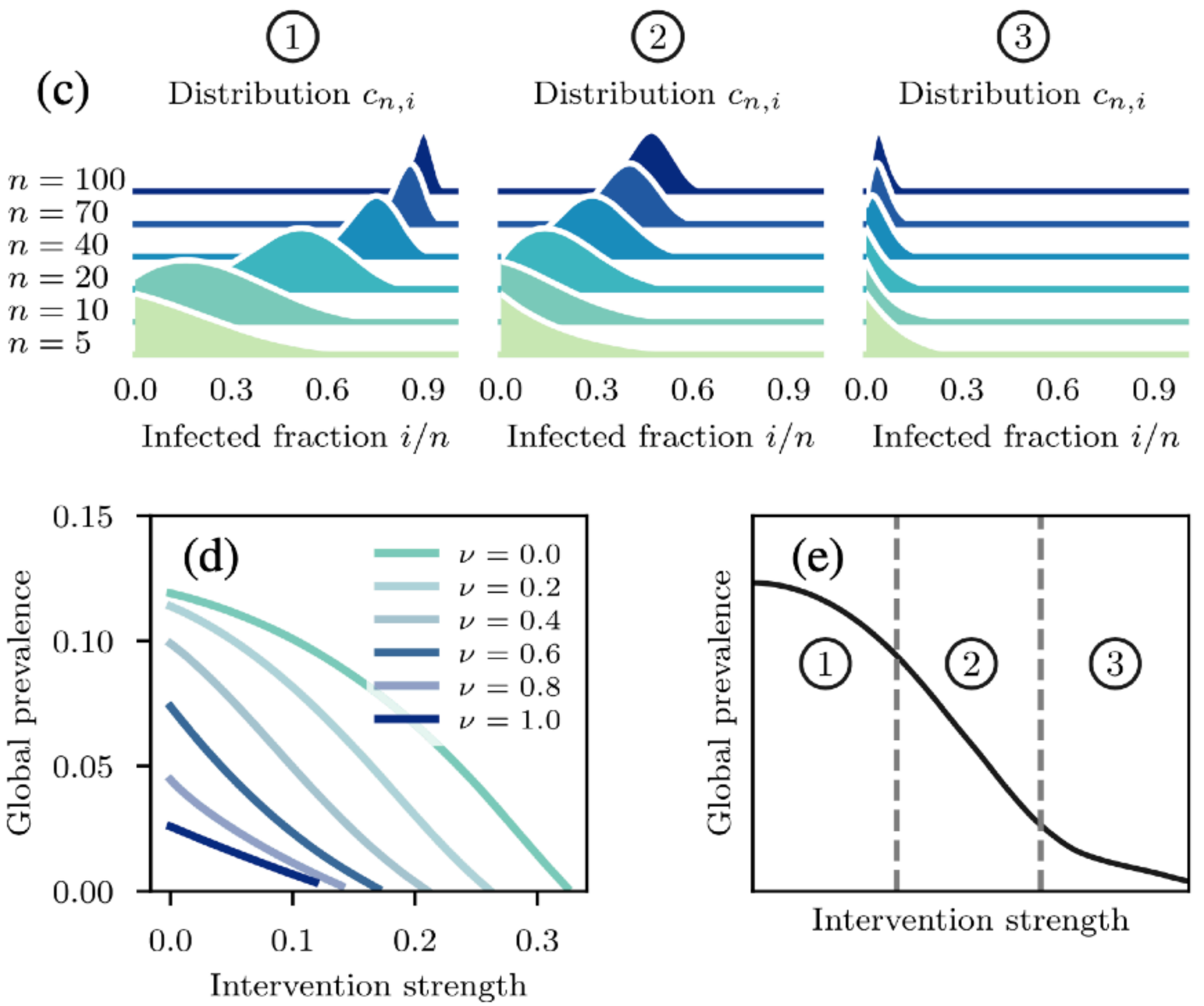
11


SIS
(a)
Delocalized
Localized
$\nu = 0$
Global prevalence
0.15
0.10
0.05
0.00
0.0
0.2
0.4
0.6
Intervention strength
SIR
(b)
Delocalized
Localized
$\nu = 0$
Final size
0.06
0.04
0.02
0.00
0.0
0.1
0.2
Intervention strength


(c)
1
2
3
Distribution $c_{n,i}$
Distribution $c_{n,i}$
Distribution $c_{n,i}$
$n = 100$
$n = 70$
$n = 40$
$n = 20$
$n = 10$
$n = 5$
0.0
0.3
0.6
0.9
Infected fraction i/n
(d)
$\nu = 0.0$
$\nu = 0.2$
$\nu = 0.4$
$\nu = 0.6$
$\nu = 0.8$
$\nu = 1.0$
Global prevalence
0.15
0.10
0.05
0.00
0.0
0.1
0.2
0.3
Intervention strength
(e)
Global prevalence
Intervention strength

Mesocopic localization

$$\nu = 0.0$$

$$\nu = 0.6$$

$\nu = 1.0$

$$\gamma_m = \gamma_n = 3.5$$

Intervention: enforcing a hard cutoff, $n_{\max}$, on the size of groups; the lower $n_{\max}$ is, the stronger is the intervention.

Message #3: Mesoscopic localization offers an opportunity for more efficient interventions.

$$\Theta_{n,i,\beta} = \beta\, i\, n^{-\nu}$$

$$\nu \in [0, 1]$$

$$p_n \propto n^{-\gamma_n}$$

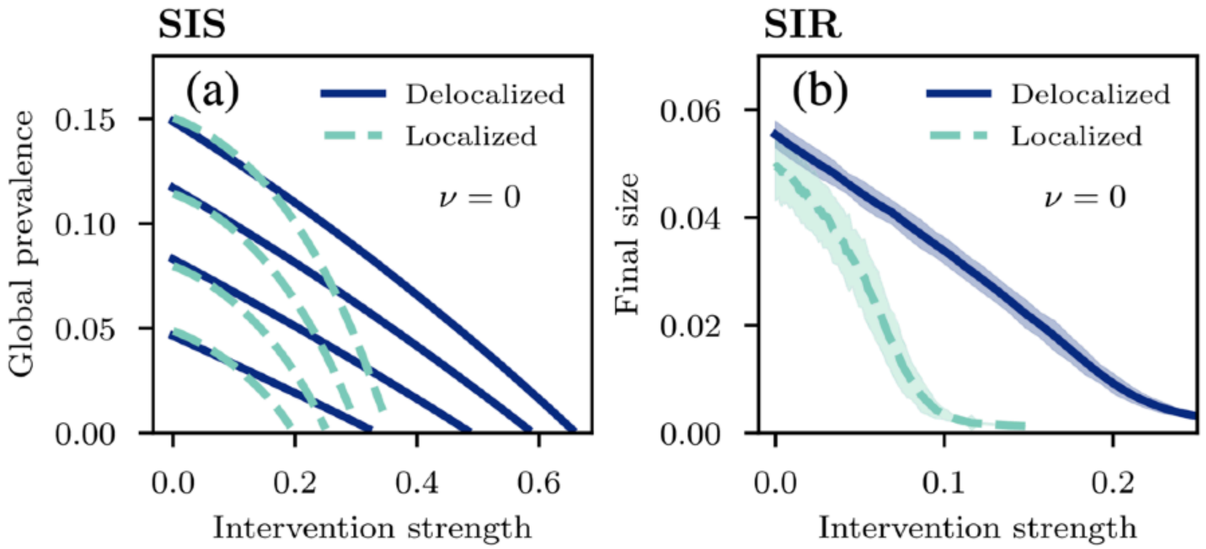
$$g_m \propto m^{-\gamma_m}$$

$$\mu = 1$$

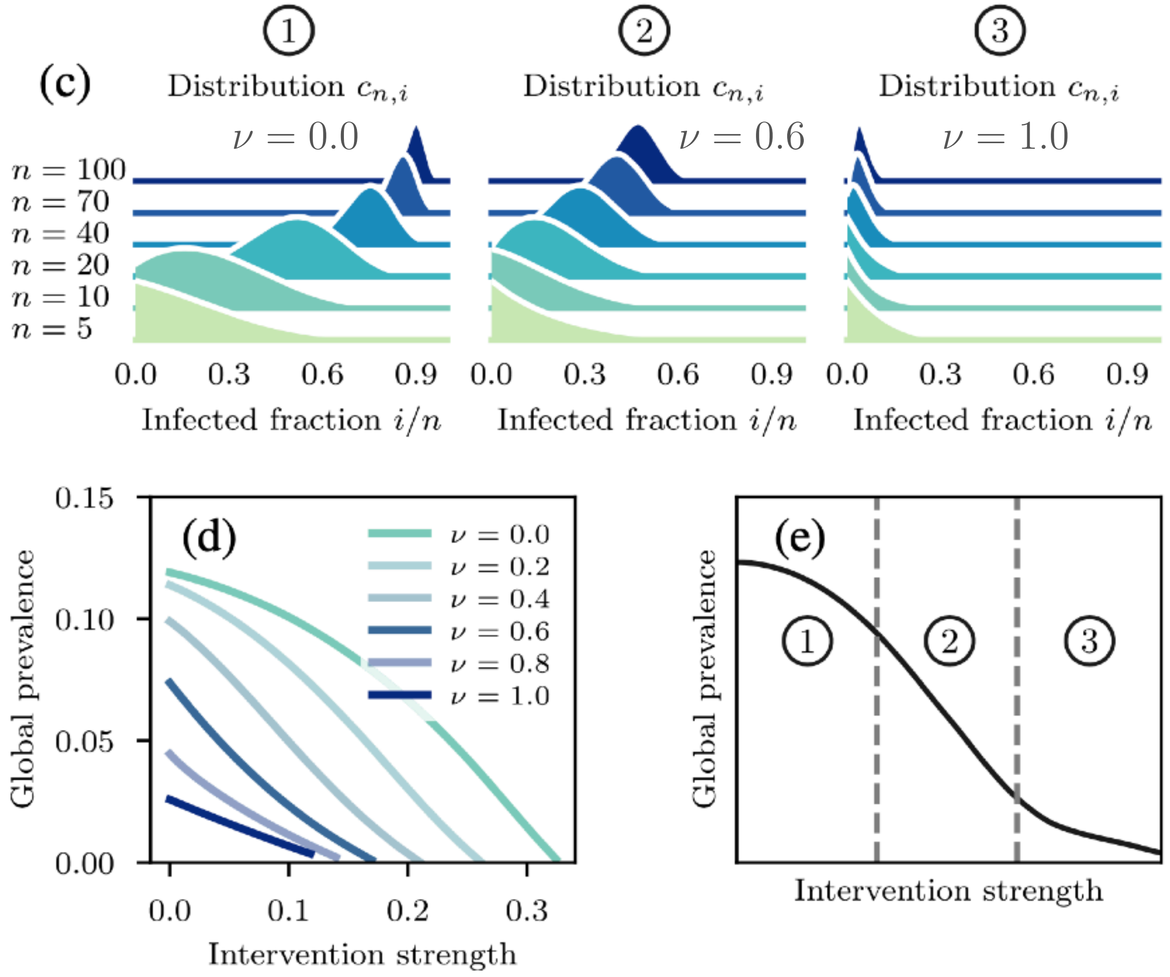
Mesocopic localization

Message #3: Mesoscopic localization offers an opportunity for more efficient interventions.

Intervention: enforcing a hard cutoff, $n_{\max}$, on the size of groups; the lower $n_{\max}$ is, the stronger is the intervention.



$$\Theta_{n,i,\beta} = \beta\, i\, n^{-\nu}$$
$$\nu \in [0, 1]$$
$$p_n \propto n^{-\gamma_n}$$
$$g_m \propto m^{-\gamma_m}$$
$$\mu = 1$$
$$\gamma_m = \gamma_n = 3.5$$



Mesocopic localization

Main takeaways

- The phenomenon of localization extends to mesoscopic structures like groups.
- Mesoscopic localization is the rule rather than the exception.
- Interventions at the group level are more efficient in presence of localization.

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PHYSICAL REVIEW E **103**, 032301 (2021)

Master equation analysis of mesoscopic localization in contagion dynamics on higher-order networks

Guillaume St-Onge,[1,2] Vincent Thibeault,[1,2] Antoine Allard,[1,2] Louis J. Dubé,[1,2] and Laurent Hébert-Dufresne[1,3,4,*]

Guillaume St-Onge
Network Science Institute

Vincent Thibeault
Université Laval

Louis J. Dubé
Université Laval

Laurent Hébert-Dufresne
Vermont Complex Systems Center