Infodemiology: the socio-behavioral dimension

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An integrative perspective on public health

When reliable therapeutic strategies are still missing or under experimentation, the behavioral dimension becomes the key variable to mitigate the effects of a pandemic.

Misleading public perceptions or legitimizing wrong conceptualizations about the pandemic and its effects may be a major threat with serious consequences.

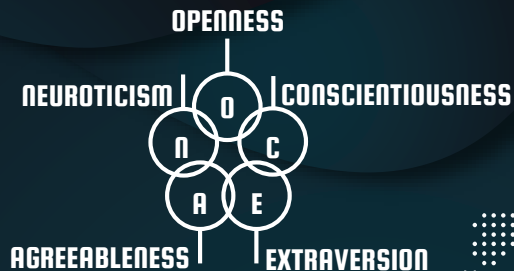This is why the infodemic dimension can be seen as the other side of the coin with respect to the pandemic.

We need to develop an integrative perspective on public health where the medical and socio-behavioral dimensions are much more tightly integrated. This includes the evaluation of the behavioral effects of public communication.

Computational social science as an innovative platform for public health mechanism design

Computational social science approaches offer us a way to define and quantify the socio-behavioral dimensions of the infodemic.

Both the emotional and the cognitive domains can be monitored by a suitable choice of indicators.

In our approach, we are mainly addressing the emotional dimension through the VAD approach. We also monitor the Big5 content as a bridging 'mass psychology' dimension where cognitive and emotional elements mix up. We finally track the cognitive dimension by defining and measuring infodemic risk associated to fake news with the highest potential of dysfunctional cognitive restructuring.

OPENNESS

NEUROTICISM CONSCIENTIOUSNESS

O
N C
A E

AGREEABLENESS EXTRAVERSION

27 JANUARY 2020 14:29 UTC
Sentiment: -0.73 (very negative)
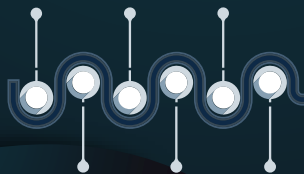
24 FEBRUARY 2020 08:29 UTC
Neuroticism: 40%

COLLECTIVE SENTIMENT & PSYCHOLOGY

Mass psychology is a complex social phenomenon. The interaction of individual perceptions, feelings and thoughts causes the emergence of collective cognitions and emotions which in turn feed back onto the individual level.

VAD spectrum describes emotional components: how much we like/dislike the situation, how much it affects us, how much we feel in control.

OCEAN spectrum describes societal 'personality': how much openness to new ideas and possibilities, consideration of others, sense of responsibility and organization, sociability and enthusiasm, anxiety, stress and shift in mood.

CoMuNe lab
COMPLEX MULTILAYER NETWORKS

The cognitive dimension: infodemic risk

We introduce an index of infodemic risk that measures the exposure to unreliable sources of information, where more unreliable sources entail higher infodemic risk

The level of infodemic risk increases with the level of cognitive manipulation that is implied

Cognitive manipulation does not only imply exposure to unreliable information but also a misleading cognitive frame to interpret it

Conspiracy theories and junk science are the most manipulative form of content. Intentionally designed fake news and hoaxes are the next most serious form

Different countries present different levels of infodemic risk and there is not a clear relationship with socio-economic development

Socio-economic factors behind the effectiveness of public health prescriptions

As a consequence, public health prescriptions are strongly sensitive to the action of socio-economic factors that should be internalized in intervention design

Lockdown and social distancing for instance clearly affects people differentially depending on: economic safety (sources of income, available savings), quality of residential space, family relations. A widespread perception of socio-economic inequality could induce the least advantaged not to comply if the measures are perceived as a toll on the most disadvantaged

Prescription of mandatory masks (such as in Lombardy starting April 6) could give people a false sense of security inducing people to go out more often. Combined with the previous effect this could be a serious threat that partly jeopardizes the effects of lockdown.

Policy implications

Designing public health interventions and the related communication requires a data-driven approach that provides a clear characterization of the emotional and cognitive context and takes into account the major socio-economic parameters and cultural factors

Evidence-based approaches on the effectiveness of the behavioral dimension of public health measures are needed. We should develop protocols similar to those for standard public health interventions

Computational social sciences offer us new tools that are complementary to laboratory experiments to develop new protocols and test their effectiveness.

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