



## Commentary and Concepts

An “Intention-Focused” paradigm for improving bystander CPR performance<sup>☆</sup>

Ashish R. Panchal<sup>a,\*</sup>, Jessica Fishman<sup>b</sup>, Teresa Camp-Rogers<sup>c</sup>,  
Roksolana Starodub<sup>d</sup>, Raina M. Merchant<sup>e</sup>

<sup>a</sup> Center for EMS, Department of Emergency Medicine, The Ohio State University Wexner Medical Center, USA

<sup>b</sup> Department of Psychiatry, Perelman School of Medicine and Annenberg School for Communication, USA

<sup>c</sup> University of Texas Health Science Center, Houston, TX, USA

<sup>d</sup> Biobehavioral Research Center, University of Pennsylvania School of Nursing, Philadelphia, PA, USA

<sup>e</sup> Department of Emergency Medicine, University of Pennsylvania, Philadelphia, PA, USA

## ARTICLE INFO

## Article history:

Received 29 September 2014

Received in revised form

15 December 2014

Accepted 15 December 2014

## Keywords:

CPR

Cardiopulmonary resuscitation

Bystander

Intention

Behavioral theory

Behavior

## ABSTRACT

Despite public education campaigns and a chest compression-only initiative, bystander cardiopulmonary resuscitation (CPR) is provided in approximately 30–40% of out of hospital cardiac arrests in the United States. Bystander CPR rates may not improve without addressing factors influencing bystanders' probability of performing CPR. We propose an “intention-focused” model for the bystander CPR performance utilizing validated behavioral theory. This model describes a framework that may predict CPR performance, with intention as the key determinant of this behavior. This model may provide specific targets for strengthening the intention to perform CPR, which could lead to increased bystander rates.

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### 1. Strengthening intentions to perform bystander cardiopulmonary resuscitation (CPR)

Many public health issues demonstrate significant improvement when interventions are developed to change behavior. These behavior change interventions have been most effective when theory-based.<sup>1–4</sup> Examples of this are seen in many areas of public health including effects on tobacco abuse, use of condoms, seat belts, sun protection and decreasing the spread of Human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS).<sup>3,5–9</sup> Prior work in reducing the risk of acquiring HIV demonstrated that group- and community-level HIV behavioral interventions were effective in reducing the odds of unprotected sex and increasing condom use.<sup>9</sup> A theory-based approach could also be applied in the development of interventions to increase the performance of bystander cardiopulmonary resuscitation (CPR).

<sup>☆</sup> A Spanish translated version of the summary of this article appears as Appendix in the final online version at <http://dx.doi.org/10.1016/j.resuscitation.2014.12.006>.

\* Corresponding author at: 760 Prior Hall, 376 West 10th Avenue, Columbus, OH 43210, USA.

E-mail address: [Ashish.panchal@osumc.edu](mailto:Ashish.panchal@osumc.edu) (A.R. Panchal).

Despite efforts to improve bystander CPR training, the rate of bystander CPR performed in the US is only 30–40%.<sup>10–13</sup> The exact etiology of this problem is unclear. However, it is known that individuals trained in CPR, when in the situation of an out of hospital cardiac arrest (OHCA), only performed CPR in 35% of cases.<sup>14</sup> This low uptake suggests that CPR training alone may not be sufficient to effect a change in bystander CPR rates. A comprehensive, systematic framework of the factors that affect an individual's probability of performing CPR may help to develop interventions that increase bystander CPR.

The current approach to increasing CPR focuses on training (e.g. self-directed learning or instructor-led courses). Although the training may provide individuals with the skills needed, this task-focused interventional approach may not be effective at increasing one's motivation to actually perform CPR. During traditional CPR training courses, the learner reads prepared material prior to class to learn the basic concepts of CPR. This is followed by a classroom course, which assists in acquiring and testing their acquisition of CPR skills. The process focuses on learning facts, skills acquisition and retention. However, during this course, there are no evaluations of a learner's intention of performing CPR or theory-based attempts to strengthen his/her intentions. There is also no clear understanding of which

psychological factors most influence the strength of intention to perform CPR.

A better understanding is needed of the *strength of intention* to perform CPR and how this may vary across different populations. Intention is an individual's perceived probability of performing a specific behavior, in this case CPR. Identifying if individuals have strong or weak intentions to perform CPR could help determine which modifiable factors influence intentions. This approach could allow for tailored interventions for learners who have strong intentions to perform CPR but may face barriers to acting on strong intentions. Another approach can be developed for those with weak intentions. If these fundamentally different behavioral barriers are addressed in the training process, this could increase CPR performance.

This evaluation seeks to direct the focus of CPR training on an individual's intention to perform CPR. In this perspective, behavioral theory is applied to the performance of CPR with presentation of a novel "Intention-focused" model of bystander CPR. The endpoint of the application of this model is (1) the ability to determine the strength of intention to perform CPR among a population of interest, (2) identifying modifiable factors which diminish a population's ability to act on strong intentions, and (3) determining the degree to which intentions to perform CPR are influenced by perceived norms, attitudes, and self-efficacy concerning CPR.

## 2. Application of behavior prediction theory to CPR performance

Within the field of social science, theory-based interventions are known to be the most effective at changing behavior.<sup>1–4</sup> According to well-validated models (e.g., The Theory of Planned Behavior and Theory of Reasoned Action), an individual's behavioral intentions capture their motivation to perform a behavior and serve as an indicator of the effort individuals are planning to exert to perform the behavior.<sup>15–17</sup> These models posit a strong causal association between intentions and behavior where changes in intentions are followed by changes in behavior, given that the individual has the skills to act and there are no environmental constraints to prevent action. When individuals have the skills and ability to act on intentions, evidence has demonstrated that interventions which strengthen intentions promote change in behavior.<sup>8,18</sup>

A shared feature of these models is that behavior is guided by "intention" which is defined as the readiness to engage in a particular behavior.<sup>19</sup> Strong intentions are necessary to performing a voluntary behavior, but they may not be sufficient.<sup>16,17</sup>

## 3. Intention focused model of bystander CPR

Applying an integrative model of behavioral prediction to the behavior of CPR performance may help to better develop new approaches for increasing CPR rates. The developed "intention-focused" model is illustrated in Fig. 1. The key aspects of this model include: (1) intention is a focus of the model and influences the likelihood of performance of CPR; (2) beliefs serve as the determinants of intention; (3) bystander characteristics are distal variables rather than primary determinants of intention or CPR behavior; and (4) accounts for the interplay of skills, environmental constraints and intention to perform CPR.

The model first focuses on intention as a proximal determinant of performing CPR. This allows for an individuals underlying beliefs to determine strength of intention. Once defined, CPR performance is then also affected by the skills needed to perform and whether the environmental constraints are significant enough to prevent action.

Second, the model recognizes that an individual's intention to perform CPR is determined by their beliefs. These beliefs are a balance of what each individual believes about the world around them. From these beliefs, the individual generates their personal attitudes about CPR (positive or negative), their perceived norms of society (what people will think if they do not perform the behavior – i.e. social pressure) and their perceived ability to perform the behavior with a predictable outcome (self-efficacy).

Third, the model notes that the bystander characteristics (e.g. age, gender, education, religion) are distal variables and play an indirect role in determining intention to perform the behavior. This is an important distinction since, as people with different educational background may have divergent beliefs about some behaviors, yet still hold similar beliefs about another behavior. Thus, these distal variables (e.g., education level) are indirectly related to behavior.

This model has the potential to shift the paradigm of bystander CPR training to an "intention focused" approach which may assist in the generation of behavior interventions that increase the performance of bystander CPR. A primary endpoint associated with this paradigm will be an increase in the intention to perform CPR, making measurements of intention an important outcome in bystander CPR research.

## 4. Applying the model: defining the determinants of intention to increase CPR

Interventions generated from this model will be focused at influencing the determinants of intention among those with weak intentions. Prior work has demonstrated that there are at least three primary determinants of intention (Fig. 1): attitude toward performing the behavior, perceived norms concerning the performance of the behavior, and self-efficacy with respect to performing the behavior.<sup>16,19</sup>

The intention-focused model also recognizes that the determinants of intention are functions of underlying beliefs. Importantly, beliefs are potentially modifiable and are the ideal targets of theory-based interventions designed to increase intention and change behavior.<sup>19</sup> The beliefs of import can serve as the basis for an intervention's message development.

Interestingly, demographic, personality, and other individual difference variables (such as perceived risk) do not necessarily play a direct role in influencing behavior and are thus conceptualized as distal variables (Fig. 1). These are "background" variables because they are often unrelated to beliefs about the behavior of interest. Thus, there is no clear relationship between these variables and any given behavior.<sup>20</sup> In contrast to beliefs, these variables are difficult or impossible to modify. For this reason, considering the performance of bystander CPR, focus must be placed not on these variables but on those which are modifiable and have an influence on intention and behavior.

## 5. Future directions for the application of the model

The validity of the use of an integrative model of behavioral prediction to develop behavioral interventions has been demonstrated in other areas.<sup>6,9,21</sup> Detailed meta-analysis have demonstrated that manipulation of intention have an effect on behavior.<sup>21</sup> Regarding CPR specifically, future studies will require study designs to demonstrate that (1) intentions to perform bystander CPR vary for different populations; (2) they can be strengthened by targeting the determinants of intention (the norms, self-efficacy and/or attitudes that explain the most variance in intention for a specific sub-population); and (3) that CPR performance is more likely among those with both strong intentions and the skills and abilities to act.

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