



# Design Cards for Culturally Sensitive Mental Health Technologies: Integrating Hofstede’s Cultural Dimension Theory into Human-Centered Design Processes

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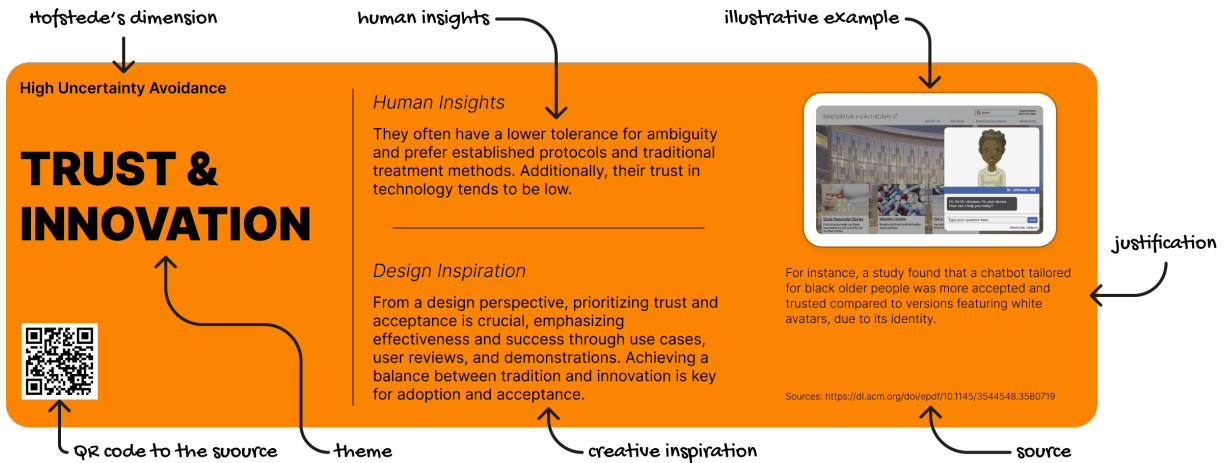


Figure 1: Example of one annotated MHxC card. The card has three main parts. On the left: we have the information about the Hofstede’s cultural dimension; in the center human insight and creative inspiration are provided to the user; on the right an illustrative example of how the consideration could be designed.

## Abstract

Despite the significant influence of culture on technology use, there is still lack of culturally sensitive approaches in mental health technology design within HCI. This paper introduces the MENTAL HEALTH x CULTURE (MHxC) card deck, a translational tool developed to support researchers and designers in this space. Drawing on Hofstede’s Cultural Dimension Theory, the deck comprises double-sided cards that depict contrasting cultural values for the five cultural dimensions. Each card combines findings drawn from existing research and illustrative examples and provides targeted design considerations and creative inspirations. We discuss the

process of creating the cards and feedback we gathered from UX designers and psychologists regarding the composition and potential value of the cards in supporting design processes. By making cultural considerations explicit and actionable, this tool encourages critical engagement with culture in technology design to help bridge the research-practice gap. The MHxC card deck has the potential to enhance cultural sensitivity in mental health technology design and support the integration of cultural awareness into human-centered design processes.

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## CCS Concepts

• Human-centered computing → Interaction design.

## Keywords

Mental Health, E-Mental Health, Culture, Design Process, Cards

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## 1 Background

Recent research in Human-Computer Interaction (HCI) highlights the critical influence of gender and culture on mental health manifestations, prompting the call for culturally sensitive technology design [2, 6, 11, 42, 51]. This aligns with the growing recognition of the need for culturally informed healthcare practices, especially evident in studies on mental distress across various cultures [3, 8, 17, 41, 47]. For instance, in many Asian countries, mental distress often manifests through somatic symptoms such as stomach pain and muscle tension, contrasting with the psychological expressions typical in Western cultures [30]. Moreover, research indicates that migrants, ethnic minorities, and religious individuals may exhibit passive behavior during medical consultations, asking fewer questions and taking less initiative compared to other general population [35, 45].

Ahmed et al. [2] extend this line of inquiry by using Hofstede’s Cultural Dimension Theory to examine how cultural influences impact mental health help-seeking behaviors. Drawing upon Reinecke & Bernstein’s application of Hofstede’s theory in interface design [42], Ahmed et al. emphasize the importance of culturally sensitive approaches in mental health technology design. Their analyses resulted in informed design considerations for researchers and practitioners.

However, translating these types of insights into practical application is often challenging as many practitioners find design guidelines and implications as presented in research publications to be abstract and inaccessible [10], limiting the impact of academic work [40]. The difficulty of implementing research findings in real-world design leads to the so-called ‘research-practice gap’, a gap between theoretical knowledge and practical domain applications [10, 43, 48]. To bridge the research-practice gap in HCI [39, 43, 48], design cards can be a powerful translational tool [10] for transforming abstract theory into actionable formats.

The efficacy of design cards has been demonstrated in diverse domains [28], including the creation of services in the sharing economy [15, 16], reflection on information systems for international justice [32], the design of resources for aging populations [37], and societal resilience [40]. Additionally, recent advancements in AI have facilitated the creation of design cards from academic papers, addressing the challenge of distilling complex research findings into actionable design insights [46]. Their tangible format supports several stages of the human-centered design process such as collaborative and playful ideation, co-design, and formative evaluation of concepts [16, 21, 28, 32, 33, 40].

Building on prior research [2, 42], our MENTAL HEALTH x CULTURE (MHxC) cards (see Appendix B) operationalize Hofstede’s cultural dimensions in mental health technology design, making insights from prior research more tangible and accessible to HCI practitioners (e.g., UX designers and researchers). We envision the

following benefits of the MHxC card deck: (1) aiding designers in creating culturally sensitive digital health solutions; (2) inspiring innovative approaches to mental health challenges; and (3) evaluating the cultural sensitivity of existing mental health tools and services. The aim of this work is to improve existing mental health technology design and research and provide an educational resource, promoting a broader appreciation of cultural influences in design practice. Our approach builds upon (and can be used with) participatory design methods, which typically implicitly incorporate variations in culture by including participants’ culturally informed perspectives in resulting designs. While participatory design methods ensure that aspects of culture are represented in the outcomes of the process, they may be somewhat incidental in comparison to more explicit design goals. Thus, our toolkit strives to make the inclusion of culture more intentional, conscious, and prominent by incorporating it systematically and explicitly into the steps of the design process.

This work contributes in three main ways: first, we present the MHxC card deck, enabling design researchers and practitioners to adopt the toolkit in practice; second, we describe the process of creating the card deck, discussing the decisions, assumptions, and trade-offs in its design; and third, we offer initial reflections and reactions from experts in psychology and UX on the potential value of the cards for designing culturally appropriate mental health technologies.

## 2 Mental Health x Culture Cards

The MHxC card deck is designed for HCI researchers and UX designers to inspire ideas and deepen cultural understanding and awareness, particularly in teamwork activities. It builds on successful tools that encourage creativity and help individuals grasp design nuances [10, 16, 21, 32, 33, 40]. Hsieh et al. categorize the intents of design cards into seven categories: Creative Inspiration, Human Insights, Material & Domain, Methods & Tooling, Problem Definition, Team Building, and Values in Practice [28]. The MHxC deck emphasizes Creative Inspiration and Human Insights. Creative Inspiration aims to stimulate innovative ideas through prompts or visuals, while Human Insights embeds knowledge about human behavior to aid designers in understanding the impact of their designs.

The MHxC card deck consists of 22 color-coded, double-sided cards and an instructional leaflet (see A), which provides a brief explanation of the cards’ purpose and content. The cards are divided into five groups, each focusing on one of Hofstede’s cultural dimensions: Individualism vs. Collectivism (five cards), Power Distance (four cards), Masculinity vs. Femininity (three cards), Uncertainty Avoidance (four cards), and Long-Term Orientation (six cards).

### 2.1 The Dimensions

Hofstede’s cultural dimensions theory provides a framework for understanding societal values and behaviors across national cultures [24–27]. It is widely used in fields such as HCI, industrial psychology, and healthcare [2, 9, 13, 19, 35, 42, 52], offering actionable insights into cultural traits through tools like Hofstede’s online platform<sup>1</sup>. Below, we summarize the connections between

<sup>1</sup><https://www.hofstede-insights.com/country-comparison-tool>

these cultural dimensions, health-related concepts, and design as synthesized by Ahmed et al. [2] based on their systematic review.

**Individualism vs. Collectivism** contrasts societies that prioritize individual achievements with those that emphasize community goals [24, 36]. Themes include *Orientation* (balance between independence and family influence in health decisions) [45, 53], *Autonomy* and *Help-Seeking Behaviors* (preferences in health management) [2], *Information Exchange* (communication styles) [11, 31], and *Views on Digital Support* (variations in digital health engagement) [5, 29].

**Power Distance** explores how societies handle power inequalities [24, 36]. Themes include *Power Inequality* (respect for authority vs. balanced guidance) [50], *Expectations* (therapeutic approaches) [2], *Self-Disclosure* (privacy levels in health discussions) [22], and *Collaboration* (doctor-patient joint exploration in health care) [4].

**Masculinity vs. Femininity** contrasts cultures that value traits viewed as masculine, such as assertiveness, with those emphasizing feminine traits like nurturing [24]. Themes include *Attitudes* (cultural openness to medical care) [2], *Approach to Treatment* (preferences from action-oriented strategies to emotional support) [24], and *Engagement Strategies* (increasing intervention engagement) [2].

**Uncertainty Avoidance** addresses how cultures manage uncertainty and ambiguity. Themes include *Trust & Innovation* (openness to new health technologies) [14, 34], *Proactiveness* (attitudes towards symptoms and treatment initiation) [49], *Communication* (health discussion styles) [2], and *Empowerment* (perception of control over health outcomes) [12].

**Time Orientation** assesses how societies prioritize long-term commitments versus short-term gratification. Themes include *Attribution* (understanding health outcomes) [24, 38], *Preventive Care* (proactive health measures) [18], *Habits* (lifestyle choices) [20], *Traditions* (adherence to health practices) [2, 24], *Social Network* (role of interpersonal relationships) [34], and *Causality* (interest in understanding health conditions) [23, 44].

## 2.2 Visual Design of the Cards

Prior to selecting cards as our communication tool, we explored other formats like checklists and guidelines. However, research suggests that these formats can be challenging for practitioners to process effectively [43]. Cards, by contrast, are versatile and facilitate discussion and reflection on cultural dimensions, fostering teamwork, creativity, and physical interaction [10, 15, 28, 33]. Their tangible nature integrates well into design workflows, serving both practical and educational purposes [10, 16, 40].

The card deck’s visual representation and layout are designed for ease of use, drawing inspiration from existing design cards in research (e.g., IDEO cards [1], SEDC [16]). We used distinctive color themes for each cultural dimension to facilitate identification, organization, and recognition during browsing, sorting, and referencing tasks. Each card within a dimension shares the same color and is double-sided, showcasing contrasting cultural extremes. This double-sided design maximizes space efficiency and helps designers grasp the spectrum of cultural variation at a glance. Each card includes (see Fig. 1): (1) **Dimension**, (2) **Theme**, (3) **Human**

**Insight**, (4) **Creative Inspiration**, (5) **Illustrative Example**, (6) **Justification of Example** and (7) **Source and QR Code**.

The **Human Insight** section presents specific findings on health behaviors for each **Dimension**, while the **Creative Inspiration** section offers corresponding design considerations and ideas. These insights and considerations are based on the systematic literature review by Ahmed et al. [2], where they were originally presented together as **Themes**. By separating them into distinct sections, we aim to help practitioners differentiate between empirical findings and design ideas, encouraging critical thinking and the exploration of alternative strategies. These sections are placed next to each other to clearly illustrate their relationship as suggested in prior research [15, 16].

Drawing on prior HCI work on card-based translational resources [10, 15], we included an **Illustrative Example** on each card. These examples provide concrete cases of how the **Creative Inspiration** can be applied, based on HCI research. They demonstrate how design considerations have been implemented in previous studies, helping practitioners gain a specific understanding of the recommendation at hand. This makes abstract concepts tangible and offers opportunities to explore further relevant research, potentially bridging the research-practice gap.

To find these examples, we used a systematic approach leveraging our team’s expertise in mental health research and design. We divided the cultural dimensions among the authors, each responsible for a subset. Using resources like the ACM Digital Library and Google Scholar, we conducted keyword searches related to themes and design considerations. We collaboratively evaluated the relevance and applicability of identified examples, considering their human insights. Through discussions and consensus-building sessions, we finalized the set of examples and added **Justification of Example** to provide context and relevance.

Lastly, we included **Source and QR Code**, allowing for easy access to the source for the **Illustrative Example**, whether the cards are in digital or printed form.

## 3 Preliminary Feedback Session Exploring the Design of Card Deck

To collect initial feedback and insights into the design and potential applications of the card deck, we conducted 6 semi-structured interviews (2 female, 4 male), in which participants were asked to reflect on the MHxC card deck. The interviews lasted between 30 to 40 minutes each and were conducted with a diverse group comprising 3 UX/UI designers (P1, P2, P3) with 4-10 years of industry experience, 2 graduate students in psychology specializing in e-mental health technologies (P4, P5), and 1 psychologist specializing in culture, gender, and mental health (P6).

The aim was to gather feedback on the concept and components of the cards, as well as to understand how participants envisioned using them. Participants were recruited through the authors’ professional networks and were provided with the link to a digital copy of the card deck, an instructional leaflet, and as reference, the cultural dimensions tables from [2] 2-3 days prior. They were asked to review these materials prior to the interview. While tangible interaction with the cards is an important aspect of their use, this phase

focused on concept and content feedback to improve the cards before evaluating them in a collaborative workshop. Interviews were conducted in person or over Zoom (not recorded), with extensive notes taken during and immediately after each session. We employed the well-known affinity diagramming technique to analyze the data from the interviews [7].

**Perceptions of the Design Cards.** Participants generally thought that the MHxC card deck would be valuable for incorporating cultural dimensions into design. They believed that it would simplify complex cultural concepts and demonstrates how culture influences design and user behavior, prompting them to think about aspects they had not considered before.

P3 and P5 raised concerns about the dimension names, noting that they may sound too scientific or complex, and suggested rewording terms like "masculinity"<sup>2</sup> to avoid misinterpretation. P2 and P3 felt the leaflet needed to offer more background information on Hofstede's framework and suggested adding more detailed descriptions. P1 also suggested explaining the importance of considering culture, highlighting its economic value to encourage adoption by individuals and companies.

P4 found it particularly valuable that the examples were connected to actual papers, allowing her to discover more relevant studies from the field of HCI and bridge her background in psychology with HCI research. She suggested that including links to relevant psychology research for each card could also enhance understanding for UX/UI designers and HCI researchers by broadening their knowledge of psychological concepts relevant to mental health technology. P1, P2, and P6 also appreciated how the cards connect research and practice, valuing the links to materials for further reading, which they often do not have time to explore in their daily work. They also suggested including links to real-world examples in addition to scientific publications for greater coverage and accessibility.

Most participants, despite having no prior experience with design cards, were enthusiastic about the concept. P3, who had previous experience with cards, noted that the inclusion of guiding questions or discussion prompts could be beneficial. He mentioned that such prompts would help facilitate discussions and make it easier for users without prior card experience to engage with them. P2 also suggested including icebreaker exercises to help users to get comfortable with the cards.

**Visuals & Layouts of the Cards.** Overall, the feedback on the layout and visuals was positive, with only small suggestions for improvement. P1 and P3 provided minor visual comments regarding text size and the positioning of the example picture.

P1 and P2 proposed using a gradient or inverting the colors on the opposite sides of the card for greater visual representation of the contrast between the cultural values. This visual differentiation could help users better understand the semantic contrast of the two sides of the cards.

P2, P3, and P5 discussed the hierarchy of the cards, noting that some cards felt higher impact than others. They suggested that the visual design could reflect this hierarchy, possibly through applying a gradient throughout the cards with the same suit, introducing numbering within each suit, highlighting the order or establishing branching on the reference leaflet.

**Opportunities & Envisioned Usages of Design Cards.** Participants identified various opportunities for using the MHxC card deck to fit their needs. P1, P3, P4, and P5 primarily saw the cards as valuable in the early phases of design, such as brainstorming and forming project directions. P1 also highlighted their potential use in scoping research questions and conducting interviews, noting that the cards increased her awareness of how cultures have differing expectations, perceptions, and acceptance regarding mental health.

P2 also felt that the cards could be useful for evaluation purposes, helping to assess why certain designs might perform better in one country than another what adjustments might be necessary.

P1, P2, and P4 emphasized the cards' value as an educational resource and tool for fostering cultural awareness in general. They believed the cards could help designers consider cultural factors more actively in their practice, not just within the mental health space, but also in advocating for the consideration of culture in the broader design process.

Overall, participants appreciated the flexibility of the cards in addressing different stages of the design process and enhancing cultural sensitivity.

## 4 Summary, Limitations & Future Work

We developed the MHxC card deck to integrate cultural dimensions into mental health technology design. Our initial interviews yielded promising feedback, highlighting the potential of the cards to help bridge the research-practice gap and connect the interdisciplinary fields of HCI and psychology. While Hofstede's Cultural Dimension theory offers a valuable framework for understanding cultural differences, it has notable limitations, particularly pertinent to the context of mental health technology. The theory tends to oversimplify and generalize cultures, potentially leading to stereotyping and ignoring individual complexities. Additionally, while recent research continues to use Hofstede's dimensions, the findings may still carry biases from the original Western-centric point of view. Moreover, the theory's national-level analysis may overlook regional, ethnic, and organizational subcultures, and may not be as relevant in our globalized world with pervasive cross-cultural interactions.

As future work, we plan to improve the card design based on participants' feedback, particularly by incorporating prompts or guiding questions to facilitate discussions [40] in generative design sessions. We are also considering how to support practitioners in applying cultural dimensions in specific design activities (e.g., reflection, evaluation) and on an individual level.

To further validate and refine our card deck, we will employ an approach used in prior card-based research in HCI [10, 15] by conducting collaborative workshops. These workshops will help us explore the cards' usability and effectiveness in practical settings with different stakeholder groups. Furthermore, we will make the cards available in an open-source format, allowing the UX design

<sup>2</sup>Note that this dimension has been recently renamed by Hofstede Insights Oy, which we'll account for in the next iteration of the cards: <https://hofstede-insights.com/frequently-asked-questions#whydidyouchangehethenameofthemasdimensionfrommasculinitytomotivationtowardsachievementandsuccess>

and HCI research community to add new findings, include bespoke examples, and improve the card deck. This approach will keep the cards useful, up-to-date, and foster a community-driven effort. We will further experiment with recent AI-driven techniques to generate the content and the examples for the cards [46] to reduce barriers to create new cards.

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## A Leaflet

# Hofstede's Cultural Dimensions

To know more about Hofstede's cultural dimension  
<https://www.hofstede-insights.com/country-comparison-tool>

### Time Orientation

Time Orientation (TO) assesses how societies prioritize **long-term commitments versus short-term gratification**.

Long TO cultures (e.g., South Korea) value **future rewards, perseverance, and maintaining traditions**.

Short TO cultures (e.g. Pakistan) focus on **immediate gratification and individual success**.

### Power Distance

Power Distance looks at how societies handle **differences in power**.

High PD cultures (e.g., Malaysia) prefer **clear hierarchies** where **authority is respected** without questioning.

Low PD cultures (e.g., Austria) prefer **equality**, where **power is shared** evenly and **authority gets questioned**.

### Masculinity Femininity

Masculinity vs. Femininity looks at how cultures view traits like **assertiveness versus nurturing**.

Masculine cultures (e.g., Japan) prioritize **achievement** and **traditional gender roles**.

Feminine cultures (e.g., Sweden) value **quality of life** and **working together** to solve problems.

### Uncertainty Avoidance

Uncertainty Avoidance (UA) examines how cultures manage **uncertainty and ambiguity**.

High UA cultures (e.g. Greece) prefer **structured environments** with **clear rules and predictability**.

Low UA cultures (e.g., Jamaica) are more comfortable with **ambiguity and risk-taking**.

### Individualism Collectivism

Individualism vs. Collectivism shows how societies **balance personal goals and group goals**.

Individualistic cultures (e.g., USA) focus on **personal achievements and rights**, valuing self-reliance.

Collectivistic cultures (e.g., China) prioritize **group goals, emphasizing teamwork** and loyalty to the community.

# The Card

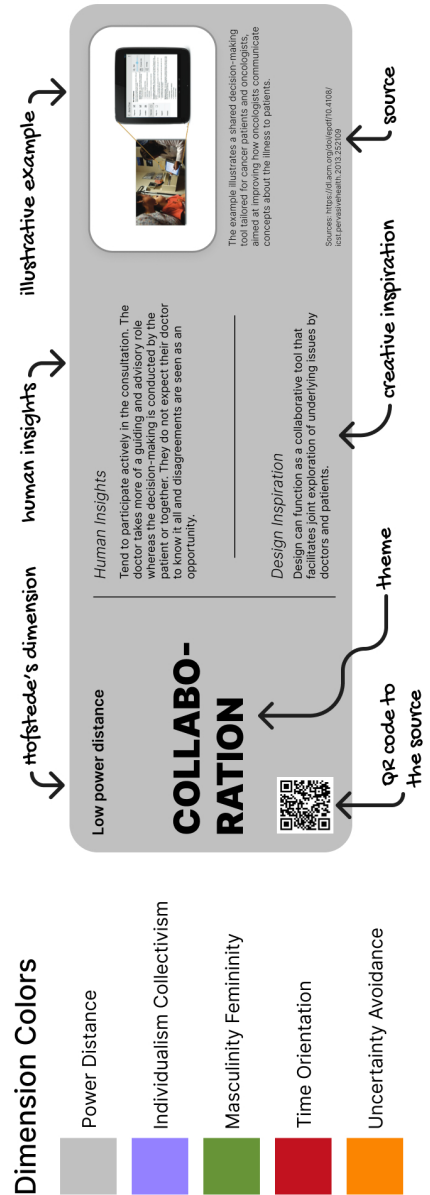


Figure 2: Fold-able instructional leaflet which explains the card deck and a brief introduction and overview of the dimensions

## B Card Deck

Here below the full card deck is presented. Each subsection represents one of Hofstede’s cultural dimension.

### B.1 High Power Distance

High power distance

# COLLABORATION

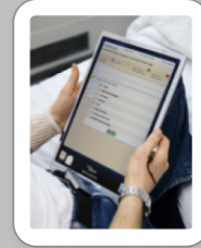


#### Human Insights

Tend to perceive doctors as the utmost authority figure and follow their words with complete obedience, delegating decision-making to them regarding their health.

#### Design Inspiration

Design interventions could aim to bridge the gap between patients and doctors, respecting patients’ preference for minimal involvement in decision-making. Tools could provide alternative ways to elicit symptoms and promote self-agency.



For instance, a tablet application is designed to help cancer patients prepare for consultations by communicating their symptoms and concerns.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2494091.2497362>

High power distance

# EXPECTATIONS

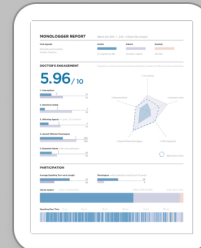


#### Human Insights

Anticipate therapists to adopt a directive approach and provide advice. Consequently, when therapists fail to meet this expectation, they run the risk of being perceived as incompetent or indifferent.

#### Design Inspiration

Design interventions can assist therapists in offering concise advice and upholding an authoritative approach, while respecting clients’ desire for clear guidance without deep involvement in decision-making.



The example features a report that is automatically generated, visualizing the communication and indicating areas where the doctor could improve for a more empathetic and clearer consultation.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2598784.2602776>

High power distance

# POWER INEQUALITY

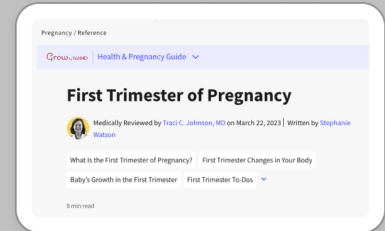


### Human Insights

Respect and value the authority of medical staff.

### Design Inspiration

Design interventions could explore emphasizing the expertise and knowledge of medical professionals, creating a platform that enhances collaboration between medical staff and patients while primarily featuring content developed by healthcare experts.



The screenshot shows WebMD, a platform designed to be a reliable source of medical information, where content is reviewed by doctors and health experts.

Sources: <https://www.webmd.com>

High power distance

# SELF-DISCLOSURE



### Human Insights

The idea of openly discussing private problems with strangers may be seen as challenging or even inappropriate. Instead, there may be a preference for maintaining the privacy and seeking guidance and support within the family or close social circles

### Design Inspiration

From a design perspective, emphasis could be placed on privacy and the inclusion of family or intimate social networks. Tools and platforms could be developed to facilitate private communication and support within trusted circles, respecting preferences for privacy and internal support mechanisms.



The example shows an app designed to help families understand each other's emotions, and supporting conversations.

Sources: <https://springwise.com/innovation/health-wellbeing/AI-for-family-mental-health/>

## B.2 Low Power Distance

Low power distance

# COLLABORATION

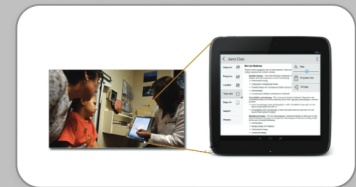


### Human Insights

Tend to participate actively in the consultation. The doctor takes more of a guiding and advisory role whereas the decision-making is conducted by the patient or together. They do not expect their doctor to know it all and disagreements are seen as an opportunity.

### Design Inspiration

Design can function as a collaborative tool that facilitates joint exploration of underlying issues by doctors and patients.



The example illustrates a shared decision-making tool tailored for cancer patients and oncologists, aimed at improving how oncologists communicate concepts about the illness to patients.

Sources: <https://dl.acm.org/doi/epdf/10.4108/icst.pervasivehealth.2013.252109>

Low power distance

# EXPECTATIONS

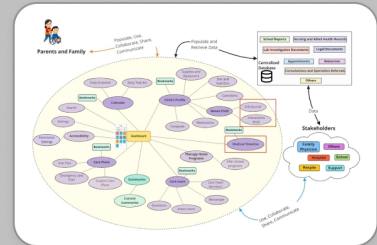


## Human Insights

Consider it ideal to involve all those who will be directly affected by a decision in the decision-making process.

## Design Inspiration

Design could encourage a collaborative approach by offering interventions that support group consultations and collective decision-making processes.



The example highlights an illustration from a paper that bridges families and caregivers, providing a holistic view of the care ecosystem.

Sources: <https://dl.acm.org/doi/10.1145/3544548.3581459#d1e2031>

Low power distance

# POWER INEQUALITY

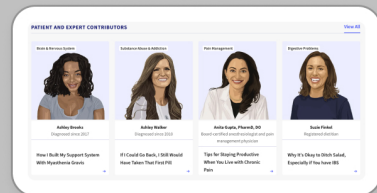


## Human Insights

Not strongly inclined towards medical staff's authority.

## Design Inspiration

Design should strike a balance between professional medical content and user-generated contributions. Platforms that facilitate both expert advice and community collaboration allow for a more egalitarian exchange of information and opinions.



The screenshot highlights content and blog entries created by both experts and patients on WebMD.

Sources: <https://www.webmd.com>

Low power distance

# SELF-DISCLOSURE

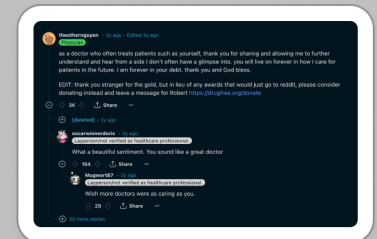


## Human Insights

Tend to experience less discomfort discussing private matters with strangers, due to a focus on equality and a casual attitude towards authority.

## Design Inspiration

Designs could promote open dialogue with professionals, creating platforms that enable simple, peer-level interactions. Such environments could leverage a relaxed attitude towards authority, fostering transparency and comfort in sharing personal issues.



The image shows a screenshot of a Reddit thread where individuals can get help from verified professionals and the community.

Sources: <https://www.reddit.com/r/AskDocs/>

### B.3 Individualism

Individualism

# AUTONOMY




*Human Insights*

Individualists place a strong emphasis on independence and personal achievement.

---

*Design Inspiration*

Design efforts might look into approaches such as gentle encouragements, fostering self-awareness, and customized notifications to bolster an individual's autonomy.



The image illustrates an application designed for individuals with bipolar disorder, utilizing tailored reminders to help sustain routines.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2785830.2785866>

Individualism

# DIGITAL SUPPORT



*Human Insights*

For individualists, who often have smaller support networks and may hesitate to seek help for personal issues, technology can offer alternative support.

---

*Design Inspiration*

Design approaches could aim at creating platforms that offer self-help, resources and information, like conversational agents.




The picture shows a chat-based mental health support for patients which provides further tools and insights to enhance their care experience.

Sources: <https://woebothealth.com/>

Individualism

# HELP-SEEKING




*Human Insights*

People with individualistic tendencies are often open to disclosing personal information to professionals, prioritizing expert guidance above group membership.

---

*Design Inspiration*

Design efforts should aim at facilitating and enhancing open and clear communication between individuals and healthcare professionals.



The illustration depicts Monarca a tool for doctors, displaying patient-tracked data in real time.

Sources: <https://dl.acm.org/doi/pdf/10.1145/2470654.2481364>

Individualism

# INFORMATION-EXCHANGE



## Human Insights

Individualists, who favor straightforward and formal interactions, typically disclose only crucial information to doctors, omitting extraneous personal details.

## Design Inspiration

Design interventions could concentrate on creating direct, efficient communication tools that honor the preference for conciseness and formality in medical exchanges.



The illustration depicts a tool for doctors, displaying patient-tracked data in real time.

Sources: <https://dl.acm.org/doi/pdf/10.1145/3313831.3376510>

Individualism

# ORIENTATION



## Human Insights

Individualists prioritize an independent self and patient-centered care.

## Design Inspiration

Design interventions might consider personalized methods and self-help techniques as alternatives to fostering community connections and relationships.



The illustration depicts an app tailored as a self-help tool specifically for individuals dealing with bipolar disorder.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2470654.2481364>

## B.4 Collectivism

Collectivism

# AUTONOMY

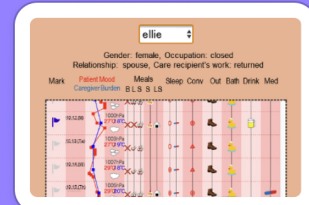


## Human Insights

Collectivists place a strong emphasis on collective interests, valuing relationships and social integration.

## Design Inspiration

Design can investigate supportive strategies that utilize social networks, aiming to encourage group collaboration to lessen feelings of isolation and helplessness.




The picture demonstrates an application for family members to monitor symptoms, identify trends, and enhance their relationships.

Sources: <https://dl.acm.org/doi/abs/10.1145/3173574.3173796>

Collectivism
Human Insights

# DIGITAL SUPPORT



Collectivists, facing challenges like social stigma in adhering to mental health interventions, may benefit from engaging designs incorporating gamification and reward structures. They also have an interactive and emotionally charged engagement with social media.

---

*Design Inspiration*

Design interventions could leverage social media for data gathering and early identification of mental health concerns.

**Table 2. Features used for predicting depression**

Name	Description
bag of words	Frequencies of words used in the tweet
topic	Ratio of tweet topics found by LDA [5]
positive	Ratio of positive-affect words contained in the tweet
negative	Ratio of negative-affect words contained in the tweet
hour	Hourly posting frequency
tweet frequency	Tweets per day
num. of words	Average number of words per tweet
RT	Overall retweet rate
mention	Overall mention rate
URL	Ratio of tweets containing a URL
followee	Number of users following
follower	Number of users followed

The example demonstrates how research can forecast depression based on social media behaviour.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2702123.2702280>

Collectivism
Human Insights

# HELP-SEEKING



Collectivists prioritize family interests, resulting in low rates of seeking help from external sources due to family intrusiveness and mental health stigma.

---

*Design Inspiration*

From a design standpoint, prioritizing privacy, confidentiality, and trust is crucial to tackle these issues. Additionally, exploring ways to foster support and awareness within families and communities is essential.




The example illustrates the seven Privacy Design Principles that could enhance the focus on privacy.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2785830.2785866>

Collectivism
Human Insights

# INFORMATION-EXCHANGE




Collectivists value doctors who take a familial, personal interest in their lives, aligning with their collectivistic values. Without this personal touch, they may see the doctor as detached.

---

*Design Inspiration*

Design solutions might thus highlight personalization and warmth in patient-doctor interactions, nurturing a feeling of care and community.



The illustration depicts a tool for doctors, displaying patient-tracked data in real time.

Sources: <https://dl.acm.org/doi/pdf/10.1145/3544548.3581459>

Collectivism

# ORIENTA-TION



## *Human Insights*

Collectivists value an interdependent self and value family-centred care.

## *Design Inspiration*

Design strategies may focus on recognizing the significance of family and personal connections, incorporating these elements into every stage of the design process.



The picture represents an app created for caregivers and parents to organize medical details about their children.

Sources: <https://dl.acm.org/doi/pdf/10.1145/3544548.3581459>

### B.5 Long Term Orientation

Long-Term Orientation

# ATTRIBUTION

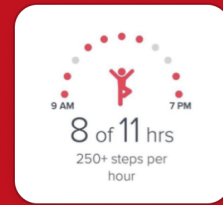


#### Human Insights

Are inclined to attribute success to effort and failure to a lack of it.

#### Design Inspiration

Design interventions should promote persistence by enabling individuals to visualize their progress.



Fitbit's "250+ Steps" feature shows users when they achieve or miss their hourly step goals, motivating them to complete the visual pattern of red dots.

Sources: <https://www.fitbit.com/global/us/technology/fitbit-app>

Long-Term Orientation

# CAUSALITY

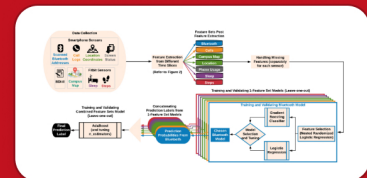


#### Human Insights

More disease-oriented and are more likely to ask "What" and "How" than "Why".

#### Design Inspiration

From a design perspective, the emphasis should be on developing tools for efficient diagnosis and treatment, providing clear and actionable information.



A machine learning approach using data from smartphones and fitness trackers accurately identified depressive symptoms at the end of the semester and predicted worsening symptoms over time among students.

Sources: <https://dl.acm.org/doi/pdf/10.1145/3422821>

Long-Term Orientation

# HABITS

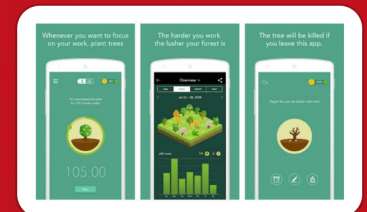


#### Human Insights

More likely to engage in health-promoting activities like regular exercise and a balanced diet.

#### Design Inspiration

From a design perspective, digital resources can play a pivotal role in reinforcing and encouraging the sustainability of positive health habits that users already possess, nurturing them until they become ingrained behaviors.



The app Forest can subtly reinforce positive habits. It encourages focus and productivity by rewarding users with virtual tree growth, leveraging existing habits in a supportive, non-intrusive manner.

Sources: <https://androidtrunk.com/wp-content/uploads/2018/09/Forest.jpg>

Long-Term Orientation

# PREVENTIVE CARE

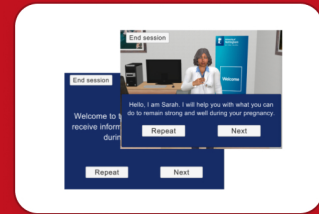


## Human Insights

Tend to value follow-up care and engage in self-screening, benefiting from interventions that provide advisory and supportive roles.

## Design Inspiration

These designs should focus on providing individuals with the necessary information and tools for informed health decisions, emphasizing continuous self-care and awareness.



The example features a conversational agent specifically designed to advise postnatal women.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3472306.3478350>

Long-Term Orientation

# SOCIAL NETWORK

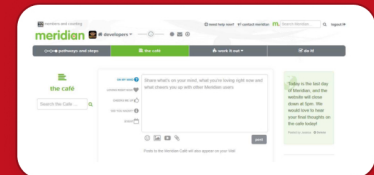


## Human Insights

Are more likely to invest in social networks or interpersonal relations with acquaintances and believe that their personal network provides resources for achievement or success.

## Design Inspiration

Design interventions could prioritize improving interpersonal relationships and involving the patient's close social network in their treatment.



A technology-mediated mental health therapy tool incorporates psychoeducation, therapist moderation, and social networking to offer support for caregivers of young people with mental illness.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3301421>

Long-Term Orientation

# TRADITIONS



## Human Insights

Tend to view traditions as adaptable to changing circumstances may be more receptive to innovative design approaches.

## Design Inspiration

From a design perspective, openness to experimental and holistic approaches suggests interventions should emphasize flexibility and innovation.



A study features a co-designed robotic coach to help university students manage public speaking anxiety, showcasing how innovative technologies like social robots can enhance mental health support.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3623809.3623872>

## B.6 Short Term Orientation

Short-Term Orientation

# ATTRIBUTION



### Human Insights

Tend to attribute both failure and success to luck or fate, which may lead to reduced motivation for ongoing care measures due to a lack of perceived immediate benefits from preventive actions.

### Design Inspiration

Design interventions here could focus on immediate results and the influence of personal effort, helping visualize ongoing progress and long-term benefits.



The example presents a tool that monitors and shows both immediate and long-term changes in mood and well-being, linking them to daily activities.

Sources: <https://www.tandfonline.com/doi/full/10.1080/07370024.2016.1277724>

Short-Term Orientation

# CAUSALITY

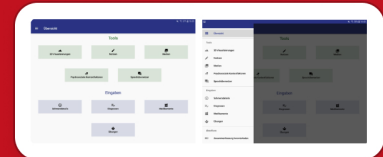


### Human Insights

More symptom-oriented and are mostly interested in the "Why".

### Design Inspiration

From a design standpoint, the emphasis should be on creating platforms that facilitate a thorough exploration of the underlying causes of symptoms and promote patient education and self-awareness.



DigiVisIn, an information therapy application aims to assist patients in better understanding the causes of orofacial tooth pain, exemplifying the concept of information therapy.

Sources: <https://www.merlin.uzh.ch/publication/show/18915>

Short-Term Orientation

# HABITS



### Human Insights

More inclined to partake in pleasurable health risks such as smoking and consuming alcohol or unhealthy eating behaviour.

### Design Inspiration

Interventions could focus on motivating health-promoting behaviors and improving adherence through interactive digital platforms that initiate and sustain lifestyle changes.



The intervention "TypeOut" effectively reduces smartphone overuse by combining an in-situ typing-based unlock process with self-affirmation content, enhancing user engagement and intervention effectiveness.


Sources: <https://dl.acm.org/doi/fullHtml/10.1145/3491102.3517476>



## B.7 Masculinity

Masculinity

# APPROACH




*Human Insights*

Tend to prefer action-focused interventions utilizing problem-solving strategies, prioritizing practical methods over talk-based therapy. Decision trees, exploratory questions to promote action, case studies, and extensive psychoeducation reframing depression as a medical condition are promoted as useful treatment components.

*Design Inspiration*

From a design perspective, the focus could be on developing interventions with action-oriented strategies and emphasising the practical utility of therapy. This could involve incorporating decision-support tools and problem-solving modules.



The example illustrates a computerized CBT-based game designed to educate patients about identifying and challenging unhelpful thoughts, as well as learning practical self-help strategies.

Sources: <https://dl.acm.org/doi/abs/10.1145/1978942.1979378>

Masculinity

# ATTITUDES



*Human Insights*

Tend to hesitate to seek medical care or engage in preventive measures, viewing unhealthy behaviors as symbols of strength, self-reliance, and independence. Additionally, they tend to prefer short-term therapy and group-based workshops.

*Design Inspiration*

From a design perspective, it's crucial to promote healthy behaviors and facilitate behavior change by aligning communication with values of strength and self-reliance, while encouraging openness towards healthcare.



DStress sets adaptive goals in exercise, meditation, and accessibility, promoting sustainable behavior change by adjusting difficulty based on individual performance.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2702123.2702512>

Masculinity

# ENGAGEMENT



*Human Insights*

Attention and adherence is gained through games and competitions.

*Design Inspiration*

From a design perspective, interventions could utilize gamification or games for treatment and improved adherence.



MindTerior is a mental health care game that measures and visualizes players' emotional states, educating them on coping strategies to mitigate negative emotions.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3544549.3583831>

## B.8 Femininity

Femininity

# APPROACH



*Human Insights*

Tend to value professionals who listen and make them feel 'heard', given their tendency to engage in 'emotional work' in their daily relationships, often providing emotional support.

---

*Design Inspiration*

From a design perspective, it's crucial to create and support environments, physical or digital, that value active listening, empathy, and emotional support. Designing interventions prioritizing trusting relationships, where individuals feel genuinely heard and understood, is essential.



The example shows a Reddit forum designed specifically as a safe space for women.

Sources: <https://www.jmir.org/2011/3/e55/PDF>

Femininity

# ATTITUDES



*Human Insights*

Tend to display a positive attitude towards seeking help and are more likely to seek medical assistance, engage in preventive care, and embrace holistic approaches.

---

*Design Inspiration*

From a design perspective, technology can provide alternatives to traditional treatments, supporting or extending traditional approaches to offer additional support for those seeking complementary healthcare options.



The example presents a tool that monitors and shows both immediate and long-term changes in mood and well-being, linking them to daily activities.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3025453.3025743>

Femininity

# ENGAGEMENT



*Human Insights*

Mutual exchange and support are more important than functionality or mastery.

---

*Design Inspiration*

From a design perspective, interventions could prioritize functionalities that promote exchange, communication, and patient connections with others in similar situations.



The example shows an online social therapy tool which offers psychoeducation while enabling users to interact with others on the platform, fostering mutual exchange.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2513179>

## B.9 High Uncertainty Avoidance

High Uncertainty Avoidance

# COMMUNICATION



### Human Insights

Tend to feel uncomfortable answering direct health questions, which can make it hard for them to express their concerns. They also tend to pay less attention to building rapport in consultations and are less likely to bring up concerns or notice cues.

### Design Inspiration

From a design perspective, technology can facilitate communication between individuals and healthcare providers, offering alternatives to traditional face-to-face interactions. The focus should be on enhancing interactions and making social cues and information exchange more explicit.



For example, the application displayed was designed to visually elicit symptoms and concerns from children more effectively.

Sources: <https://dl.acm.org/doi/pdf/10.1145/3290607.3299068>

High Uncertainty Avoidance

# EMPOWERMENT



### Human Insights

Tend to feel more powerless when it comes to their health and attribute outcomes to external forces.

### Design Inspiration

From a design perspective, interventions should highlight the benefits of treatment, preventive measures, and follow-up care, while empowering individuals to take control of their health outcomes.



Pepper, a social robot, facilitates social interactions and voice-based health assessments, aiding in aging with agency by providing support for self-health monitoring among older adults.

Sources: <https://ieeexplore.ieee.org/document/8409927>

High Uncertainty Avoidance

# PRO-ACTIVENESS



### Human Insights

Due to their high anxiety and stress levels, they tend to seek extensive information and second opinions to alleviate uncertainty and minimize risks. This often leads to inappropriate use of prescription drugs, driven by their fear of taking no action.

### Design Inspiration

From a design perspective, it's about reducing uncertainty by educating users about their health concerns and options. This includes providing access to resources and enabling effective knowledge transfer.



Thymun is a mobile application designed for individuals with autoimmune diseases. It allows users to track their symptoms, vital information, and lab results, providing them with a comprehensive personal health record, allowing them to take agency over their own health.

Sources: <https://www.jmir.org/2011/3/e55/PDF>

High Uncertainty Avoidance

# TRUST & INNOVATION

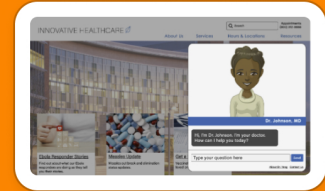


## Human Insights

They often have a lower tolerance for ambiguity and prefer established protocols and traditional treatment methods. Additionally, their trust in technology tends to be low.

## Design Inspiration

From a design perspective, prioritizing trust and acceptance is crucial, emphasizing effectiveness and success through use cases, user reviews, and demonstrations. Achieving a balance between tradition and innovation is key for adoption and acceptance.



For instance, a study found that a chatbot tailored for black older people was more accepted and trusted compared to versions featuring white avatars, due to its identity.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3544548.3580719>

## B.10 Low Uncertainty Avoidance

Low Uncertainty Avoidance

# COMMUNICATION



## Human Insights

Tend to prioritize eye contact and rapport-building with their doctors, leading to more open doctor-patient relationships and exchanges of psychosocial information.

## Design Inspiration

From a design perspective, technology should enhance communication without overshadowing the doctor-patient relationship, which remains the primary focus.



The Monarca system automates sending triggers and early warning signs to clinicians for patients with bipolar disorder based on their daily activities like eating, sleeping, and medication. This provides additional data for consultations.

Sources: <https://dl.acm.org/doi/epdf/10.1145/2110363.2110370>

Low Uncertainty Avoidance

# EMPOWERMENT



## Human Insights

Tend to attribute results and treatment outcomes to their own abilities or shortcomings.

## Design Inspiration

From a design perspective, it's crucial to highlight the multifaceted nature of health outcomes and educate patients about various contributing factors beyond their control. Interactions should be crafted carefully to avoid negative framing that could evoke feelings of failure or guilt.

Construct	Implications for Design of BC Monitoring Technology
Behavioral capacity	Provision of education and training to develop specific skills aimed at a particular health behavior; Leverage benefits of interactive capabilities of computing systems for learning; Utilize video capability for skills training.
Emotional coping	Provide problem solving training for stress management. Offer features that enhance social networks for support during difficult times from others who have had similar experiences.
Expectations	Provide real-time feedback in response to desired health action in a manner that reinforces healthy and realistic expectations.

The screenshot illustrates the concept of framing health data for children with diabetes to ensure understanding without triggering negative emotions.

Sources: <https://dl.acm.org/doi/pdf/10.4108/icst.pervasivehealth.2013.252116>

Low Uncertainty Avoidance

# PRO-ACTIVENESS

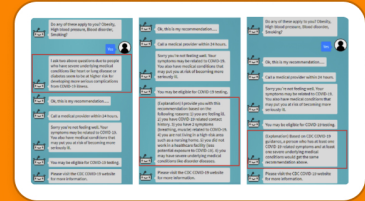


### Human Insights

Due to their generally low stress and anxiety levels, individuals often overlook symptoms, avoid antibiotics and prescription drugs, and adopt a 'wait-and-see' approach to health issues.

### Design Inspiration

From a design standpoint, the focus is on guiding users in their decision-making process, assisting them in balancing between waiting and taking action on symptoms.



The example shows an online symptom checker in the form of a chatbot that facilitates self-diagnosis and triage based on reported symptoms.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3411764.3445101>

Low Uncertainty Avoidance

# TRUST & INNOVATION



### Human Insights

Tend to show greater openness to innovative treatment approaches and also are more willing to explore alternative and complementary therapies.

### Design Inspiration

From a design perspective, innovation is vital due to these individuals' openness to new technology.

Message Type	Brief Description	Example Message (Cerebrocenter®)
Self-Care	Messages that prompt you to take good care of yourself, include yourself, or be kind and compassionate to yourself.	Remember you just need a small amount of personal time. It's okay to take that time for yourself!
Gratitude	Messages that prompt you to reflect on things you are grateful for, or to express gratitude.	Thank of a person you are thankful for.
'Thought Challenge'	Messages that help you to identify unhelpful patterns of thinking and find new ways of thinking about things.	Today, spend some time thinking about how you react to things. If you react too negatively, try to change it to positive.
Inspiration	Messages that convey hope and build confidence about possibilities to come.	Today is your day. Nothing can stop you.
Relaxation	Messages that help you to calm down or gain a sense of well-being through exercises such as stretching, breathing, or meditation.	Stop and breathe for a minute. Take in your surroundings.
Problem Solving	Messages that help you make and carry out plans to resolve issues.	Don't run away from your problems. Break them down and tackle each step.
Positive Activities	Messages that prompt you to plan or engage in enjoyable activities.	Try to take a pleasure drive or a nature walk out in a park or forest to help lift your spirits.
Reassurance	Messages that remind you that facing challenges is normal, and that things are going to be okay or that they are not as bad as they might seem.	It's okay to feel overwhelmed.

A study explored how they can contribute to improving push-based mental health messaging tools, generating messages on self-care, positive thinking, and relaxation to offer guidance and encouragement.

Sources: <https://dl.acm.org/doi/epdf/10.1145/3512946>