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Social marketing in contexts of uncertainty: An analysis of social capital and health social support in online health communities facing treatment uncertainty

Nuno Tiago Cláudio Leitão Baptista

Tese para obtenção do Grau de Doutor em
Marketing e estratégia

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Coorientador: Prof. Doutor José Carlos Martins Rodrigues de Pinho

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Resumo

Para vários tratamentos médicos existe considerável incerteza médica e científica sobre os benefícios e riscos relativos. A literatura indica o apoio social como um importante fator na gestão de incertezas na saúde. O conceito de apoio social despertou muito interesse nas áreas de medicina comportamental e psicologia. No entanto, não é clara a forma como o conceito pode ser abordado em intervenções de marketing social uma vez que existem poucos estudos conceptuais e empíricos focados neste tópico na literatura de marketing social. A presente tese investiga a forma como o conceito de apoio social pode ser aplicado a contextos caracterizados por incerteza nos tratamentos médicos. Para atingir este objetivo, em primeiro lugar procedeu-se a uma revisão da literatura focada em intervenções de marketing social na área da saúde que reportam a utilização do conceito de apoio social. Os resultados indicam que as intervenções de marketing social analisadas operacionalizaram o conceito de apoio social em conexão com as dimensões chave do marketing social, incluindo os princípios de mudança comportamental, investigação sobre o consumidor, segmentação e *targeting*, o princípio do intercâmbio, bem como o marketing mix e análise da competição. Contudo, também se concluiu que a generalidade das intervenções abordam o conceito de forma pouco rigorosa e que não reportam o racional teórico para a operacionalização do conceito. Em segundo lugar, o estudo adota uma abordagem mista envolvendo netnografia e análise de redes sociais, para examinar a natureza do apoio social virtual, entendido como um recurso gerado através de capital social, em comunidades de saúde virtuais sujeitas a incerteza nos tratamentos, usando dois casos de estudo: um fórum online dedicado à discussão de cigarros eletrónicos e um fórum online focado no tema do tratamento hormonal para mulheres em menopausa. Concluiu-se que estas comunidades online podem servir como um espaço de extensão às redes de suporte de indivíduos sujeitos a incerteza nos tratamentos uma vez que múltiplas tipologias de apoio social parceiro-a-parceiro são prestadas remotamente nas comunidades virtuais. Ambas as comunidades analisadas apresentam uma estrutura de rede semelhante, caracterizada por propriedades de "pequeno-mundo", propriedades de "escala livre" e reduzidos índices de reciprocidade. Os resultados também indicam que a generalidade dos utilizadores procura apoio do tipo informacional nas comunidades e que estes podem ser segmentados tendo por base as posições estruturais que ocupam nas redes e os respetivos padrões de apoio social. No entanto, foi igualmente descoberto que a informação disponível nestes fóruns pode estar sujeita a processos imprudentes de seleção pelos participantes nos fóruns, que tentam conformar as discussões online por forma a

servirem as narrativas aceites e amplamente difundidas que realçam os benefícios destes tratamentos incertos enquanto minimizam os respetivos riscos. Do ponto de vista teórico, este estudo apresenta implicações importantes para a literatura sobre gestão de incerteza ao colocar em evidência processos coletivos de seleção de informação nas comunidades online que podem prejudicar a função primordial destes espaços online, que é funcionarem como plataformas para a aquisição de conhecimento. Em segundo lugar, o estudo aprofunda o conhecimento sobre as relações interdependentes entre os conceitos de capital social e apoio social. O estudo também apresenta inovação em termos metodológicos ao combinar analise se redes sociais com netnografia, duas metodologias naturalistas e perfeitamente adaptadas ao ambiente online, para estudar comunidades de saúde online. Para a prática, os resultados deste estudo oferecem conhecimentos significativos que podem ser usados para a programação de ações de marketing social destinadas a melhorar a qualidade e quantidade do apoio social disponível neste tipo de comunidades online.

Palavras-chave

Incerteza nos tratamentos; Comunidades de saúde online; Capital social; Apoio social; Marketing social.

Resumo alargado

Nos últimos anos tem-se assistido ao crescimento na utilização de princípios e técnicas de marketing social na área da saúde, com resultados muito encorajadores. Os exemplos são diversos e incluem a promoção da cessação tabágica, de hábitos de vacinação, a adoção de práticas de exercício físico ou hábitos de alimentação mais saudável, entre outros. De uma forma genérica, as intervenções na área da saúde que adotam princípios de marketing social têm como objetivo a promoção de determinada mudança comportamental por parte dos públicos alvo, ou seja, pretende-se influenciar os públicos alvo por forma a que estes adotem de forma voluntária comportamentos mais saudáveis. Contudo, em contextos caracterizados por elevada incerteza na área da saúde a utilidade do marketing social pode ser questionável.

O conceito de incerteza reveste-se de grande importância na área de medicina, podendo ser identificado em conexão com múltiplos aspetos da saúde, de entre os quais os tratamentos médicos. Para vários tratamentos médicos existe considerável incerteza médica e científica quanto aos benefícios e riscos relativos. Em resultado desta incerteza as autoridades públicas na área da saúde podem não emitir regulamentação clara e objetiva sobre os tratamentos, impondo desta forma dificuldades aos profissionais de saúde e aos doentes, que se vêm na contingência de terem de gerir a incerteza nos tratamentos médicos e assumir decisões complexas.

Nesta tese, propõem-se que em contextos de incerteza médica o marketing social se foque na promoção de apoio social entre pares, ou seja entre pessoas que enfrentam o mesmo contexto de incerteza. O apoio social pode ser entendido como uma forma de suporte, resultante do capital social, que se traduz em apoio do tipo emocional, de estima, tangível, de rede ou do tipo informacional. O conceito de apoio social despertou muito interesse nas áreas de medicina comportamental e psicologia devido à proliferação de estudos que validam uma relação positiva entre o apoio social e a saúde física e psicológica. A literatura indica o apoio social como um importante auxílio à gestão de incertezas na saúde. Estudos empíricos anteriores associam ao conceito uma otimização do processo de tomada de decisão, melhorias do nível de informação e uma redução do stress usualmente associado a contextos de incerteza. No entanto, não é clara na literatura a forma como o conceito pode ser aplicado em intervenções de marketing social uma vez que se regista uma escassez de estudos conceptuais e teóricos focados neste tópico na literatura de marketing social.

Para se entender a forma como o conceito de apoio social pode ser operacionalizado em intervenções de marketing social recorre-se nesta tese ao estudo de sistemas existentes de apoio social em contextos de incerteza nos tratamentos médicos. A presente tese foca-se no fenómeno das comunidades de saúde online, que constituem espaços virtuais nos quais os utilizadores podem trocar apoio social. Este estudo analisa as interações de apoio social em duas comunidades online distintas, ambas caracterizadas por elevado nível de incerteza nos tratamentos, nomeadamente uma comunidade online dedicada à discussão sobre cigarros eletrónicos para feitos de cessação tabágica, e uma comunidade online dedicada ao tema do tratamento hormonal para mulheres em menopausa.

Sendo o apoio social considerado em alguma literatura um produto do capital social, a presente tese adota o modelo teórico de capital social de Nahapiet e Ghoshal para estudar as interações de apoio social nos dois casos de estudo nas suas perspetivas estrutural, relacional e cognitiva. O principal objetivo da tese é entender a forma como o capital social influencia as condições de interação de apoio social, e desta análise extrair linhas orientadoras que permitam planear intervenções de marketing social destinadas a aumentar a quantidade e melhorar a qualidade do apoio social disponível em comunidades de saúde online sujeitas a incerteza nos tratamentos. A presente tese encontra-se organizada na forma de ensaios, sendo composta pelas seguintes componentes principais:

i) Um primeiro ensaio consistindo numa revisão de estudos empíricos que reportam a operacionalização do conceito de apoio social em intervenções de marketing social na área da saúde com o objetivo de se entender a forma como o conceito tem sido operacionalizado em intervenções práticas e qual o racional teórico para a sua operacionalização;
ii) Um segundo ensaio resulta de um estudo netnográfico das duas comunidades online objeto de estudo, no qual se explora de forma qualitativa as dimensões estrutural, cognitiva e relacional do capital social em conexão com o apoio social;
iii) Um terceiro ensaio analisa a estrutura de apoio social nas duas comunidades online que constituem os casos de estudo, utilizando a técnica de análise de redes sociais, e se procede à análise dos padrões de apoio social e à segmentação dos utilizadores das comunidades, tendo por base o seu posicionamento nas redes e o respetivo perfil de interação de apoio social.

Atendendo à inexistência de uma revisão de literatura sobre o tema, e considerando a escassez de estudos teóricos e conceptuais que explorem o conceito de apoio social na perspetiva do marketing social, numa primeira fase do estudo procedeu-se a uma revisão

da literatura focada em intervenções de marketing social na área da saúde que reportam a utilização do conceito. Os objetivos específicos desta revisão foram o de entender a forma como o conceito tem vindo a ser operacionalizado em intervenções práticas no terreno e qual o racional teórico indicado pelos autores para a utilização do conceito nas referidas intervenções. Para atingir estes objetivos as bases de dados *PsycINFO*, *PubMed*, *ISI Web of Science* e *Scopus* foram pesquizadas desde a sua incepção até setembro de 2018, no sentido de identificar artigos académicos que reportassem a aplicação do conceito de apoio social em intervenções de marketing social na área da saúde. Desta pesquiza resultou a identificação de 19 intervenções de marketing social, que foram objeto de análise detalhada. Os resultados da análise indicam-nos que as intervenções operacionalizaram o conceito de apoio social em conexão com as dimensões chave do marketing social, incluindo os princípios de mudança comportamental, investigação prévia sobre o consumidor, segmentação e *targeting*, o princípio do intercâmbio, bem como o marketing *mix* e análise da competição. Contudo, também se concluiu que a generalidade das intervenções aborda o conceito de forma pouco integrada e rigorosa, não oferecendo sequer uma definição precisa de apoio social e não reportando o racional teórico para a operacionalização do conceito. Por outro lado, constatou-se igualmente que a maioria das intervenções não apresenta uma componente de medição dos resultados diretamente atribuíveis ao apoio social e que nenhuma intervém no sentido do reforço das aptidões e da predisposição dos indivíduos alvo para se envolverem em interações de apoio social.

Numa segunda fase, o estudo adotou uma abordagem mista, qualitativa e quantitativa, envolvendo netnografia e análise de redes sociais, para examinar a natureza do apoio social virtual, entendido como um recurso gerado através de capital social, em comunidades de saúde virtuais sujeitas a incerteza nos tratamentos, usando os dois casos de estudo anteriormente referidos.

O estudo netnográfico das comunidades online visou entender de que forma as dimensões estrutural, relacional e cognitiva do capital social influenciam as condições para o apoio social entre pares em comunidades online caracterizadas por incerteza nos tratamentos médicos. O estudo contemplou duas etapas: i) uma primeira etapa, passiva e meramente observacional, na qual se observou as comunidades sem interagir diretamente com os seus membros para se entender a cultura e normas dos fóruns, e se extraiu as mensagens online dos 200 tópicos de discussão mais recentes em cada comunidade, que foram sujeitas a análise temática e de conteúdo; ii) e uma segunda etapa, mais ativa, e mais alinhada com a abordagem tradicional em estudos etnográficos, na qual o investigador integrou ambas as comunidades, como membro de pleno direito,

interagindo com os restantes utilizadores e colocando questões pertinentes para a presente investigação. Relativamente à dimensão estrutural, concluiu-se que estas comunidades online podem servir como um espaço de extensão às redes de suporte de indivíduos sujeitos a incerteza nos tratamentos uma vez que múltiplas tipologias de apoio social parceiro-a-parceiro são prestadas remotamente nas comunidades virtuais. Verificou-se que os membros das comunidades procuram sobretudo apoio do tipo informacional, em particular informação na forma de testemunhos que reportam a experiência pessoal dos utilizadores com estes tratamentos. Quanto à dimensão relacional do capital social, constatou-se existir nas comunidades uma perceção de reciprocidade generalizada, que leva os utilizadores a acreditarem que o apoio que prestam será eventualmente correspondido. Verificou-se igualmente que, não obstante as dificuldades causadas pela impessoalidade do ambiente online, os utilizadores podem desenvolver confiança nos outros membros. Identificou-se ainda a possibilidade de existência de múltiplas e contraditórias identidades sociais nos fóruns, que correspondem a interesses específicos e diferenciados nos tratamentos. No estudo da dimensão cognitiva do capital social descobriu-se que ambos os fóruns possuem uma linguagem própria e um sistema de códigos específico que os novos utilizadores devem assimilar para poderem beneficiar na plenitude do apoio social disponível. Verificou-se que as narrativas vigentes em ambas as comunidades online são controladas por um pequeno grupo central de utilizadores e que a informação disponível pode estar sujeita a processos imprudentes de seleção pelos atores centrais nos fóruns, que tentam conformar as discussões online por forma a servirem as narrativas que realçam os benefícios destes tratamentos incertos enquanto minimizam os respetivos riscos.

Com o objetivo de reforçar a análise da dimensão estrutural do capital social nas comunidades online que constituem os casos de estudo, aplicou-se a técnica de análise de redes sociais para se investigar as propriedades estruturais e morfológicas das redes de interação de apoio social, tendo-se ainda analisado os padrões de apoio social e desenvolvido um modelo de segmentação dos utilizadores, cujas variáveis de segmentação refletem as posições estruturais que os utilizadores ocupam nas redes de interação de apoio social e o perfil individual de interações. Concluiu-se que ambas as comunidades analisadas apresentam uma estrutura de rede idêntica, caracterizada por propriedades de "pequeno-mundo", propriedades de "escala livre" e reduzidos índices de reciprocidade díade. Testes não paramétricos do qui-quadrado revelaram diferenças significativas entre o apoio do tipo informacional e os restantes tipos de apoio social, confirmando assim o que era aparente do estudo netnográfico – que os utilizadores procuram sobretudo informação nas comunidades online. No que concerne à

segmentação dos utilizadores recorreu-se à técnica de análise de *clusters*, tendo sido possível definir um modelo de segmentação aplicável a ambas as comunidades online, que divide os utilizadores em quatro segmentos: o primeiro cluster, apelidado de "pesquisadores de conhecimento" inclui membros que procuram as comunidades online fundamentalmente para obter informação, encontrando-se no lado recetor das interações sociais; o segundo cluster inclui os "fornecedores de conhecimento", significando os utilizadores que contribuem para as comunidade oferecendo sobretudo apoio do tipo informacional e que providenciam mais suporte do que aquele que recebem; o terceiro cluster, designado por "construtores de comunidade", descreve o segmento de utilizadores com os índices mais elevados de capital social de ligação (*bonding social capital*) e que proporcionam maioritariamente apoio social do tipo emocional e de estima; o quarto e último cluster é aquele de dimensão mais reduzida e inclui os atores mais centrais (índices mais elevados de centralidade) e que apresentam igualmente os indicadores mais elevados de capital do tipo ponte (*bridging social capital*). Optou-se por designar este último segmento como os "influenciadores".

Atendendo à análise efetuada sugere-se que estratégias de marketing social destinadas ao aumento do número de membros das comunidades virtuais, e por conseguinte, da quantidade de apoio social disponível, promovam estas plataformas como espaços privilegiados para troca de informação, uma vez que o estudo realizado indica ser esta a tipologia de apoio social mais valorizada pelos membros das comunidades. Para obviar as barreiras que resultam do controlo das narrativas nos fóruns por grupos centrais de utilizadores com posições pró-tratamento, esta investigação aplica a teoria do intercâmbio social (*social exchange theory*) e sugere a promoção de testemunhos pessoais voluntários nos fóruns, em troca de estatuto simbólico, melhorando assim os índices de reciprocidade generalizada e diminuindo o controlo social exercido pelos utilizadores mais centrais. É igualmente sugerido que os programas de marketing social explorem de forma efetiva os diferentes segmentos de utilizadores e definam estratégias de marketing adequadas para cada segmento, com o objetivo de melhorar a qualidade do apoio social disponível neste tipo de comunidades. Para aumentar os níveis de reciprocidade nos fóruns sugere-se que os programas de marketing social se concentrem no segmento dos "pesquisadores de conhecimento" com maior antiguidade nos fóruns uma vez que estes utilizadores, em resultado da sua experiência nos fóruns, estarão em melhores condições de transitar para o papel mais exigente de prestadores de apoio social. Por forma a minimizar algumas das consequências negativas do capital social, incluindo conflitos, e agressão verbal nos fóruns, sugere-se que os programas de marketing social se foquem no segmento dos "influenciadores" uma vez que estes

membros, pela posição central que ocupam nos fóruns, beneficiam de uma vantagem estratégica no que respeita à sua capacidade para influenciar os processos de interação social. Finalmente, quando o objetivo é passar uma mensagem de marketing convincente nos fóruns, o segmento dos "construtores de comunidade" deve ser considerado, uma vez que este segmento, com o seu alto nível de capital social de ligação, inclui os elementos que estabelecem relações sociais mais fortes nas comunidades, beneficiando de maior confiança por parte dos restantes membros.

Esta tese apresenta diversas contribuições para a teoria. Em primeiro lugar o estudo gera conhecimento sobre o modo como as comunidades online de saúde funcionam como plataformas de apoio social para indivíduos sujeitos a incerteza nos tratamentos e a forma como o capital social poderá influenciar as interações de apoio social. Em segundo lugar o estudo contribui para o tópico da gestão de incerteza na saúde ao colocar em evidência processos coletivos de seleção de informação nas comunidades online que colocam em causa a função primordial destas comunidades, que é funcionarem como plataformas para a aquisição de conhecimento. Este estudo apresenta uma revisão de intervenções de marketing social na área da saúde que operacionalizam o conceito de apoio social, uma análise que até ao momento não tinha sido empreendida na literatura, e que é tanto mais significativa se considerarmos a escassez de literatura teórica e conceptual sobre o tema na área de marketing social. Uma contribuição adicional resulta da metodologia de investigação aplicada. A combinação pouco frequente de netnografia e análise de redes sociais adaptou-se perfeitamente ao objeto de estudo consistindo em comunidades online, e às dificuldades em aceder às comunidades em causa resultantes de uma certa estigmatização social das pessoas que utilizam tratamentos incertos. Para a prática, os resultados deste estudo proporcionam conhecimentos significativos que podem ser usados por entidades públicas, privadas e sem fins lucrativos e as entidades responsáveis pela gestão destas comunidades para a programação e implementação prática de ações de marketing social visando o aumento da quantidade e a melhoria da qualidade de apoio social disponível neste tipo de comunidades.

Abstract

For several medical treatments there is considerable scientific and medical uncertainty about the relative benefits and risks they imply. The literature indicates social support as an important factor in health uncertainty management. The concept of social support has gained considerable interest in the areas of behavioral medicine and health psychology research. Despite such interest, it is still not clear how it can be approached in social marketing interventions since there is a lack of conceptual and empirical literature discussing the concept from a social marketing perspective. The present thesis aims to explore how the social support concept can be better approached in social marketing interventions targeting contexts of treatment uncertainty. To attain this objective, first a scoping review of social marketing interventions in the health area operationalizing the concept of social support was undertaken. Results indicated that interventions have operationalized the concept in connection with all the key aspects of social marketing, including behavioral change, consumer research, segmentation and targeting, and exchange, as well as marketing mix and competition. However, the findings also indicated poor conceptualizations of social support and the underreporting of the theoretical rationale for the operationalization of the concept. Second, the study adopted a mixed-methods approach that involved netnography and social network analysis, to examine the nature of online social support, understood as a resource generated through social capital, using two distinct case studies: i) an online forum focused on health discussion about electronic cigarettes; ii) an online forum dedicated to menopausal hormone replacement therapy. Findings indicate that online health communities can be a place for extending the support networks of people facing treatment uncertainty as multiple typologies of peer-to-peer social support are remotely exchanged in the virtual communities. Both online health communities were found to have similar network structures characterized by small-world and scale free properties and reduced levels of reciprocity. Results also indicate that users mostly search for

informational types of support in the online health communities and that they can be segmented based on the structural positions they occupy in the networks and patterns of support interaction. However, it was found that the information available in these forums can be subject to imprudent processes of selection by forum participants who try to conform online discussion to suit the forums' shared and accepted narratives that highlight the benefits of these uncertain treatments, while minimizing the respective risks. From a theoretical perspective, this study has relevant implications for health uncertainty management literature by putting in evidence collective processes of information selection in the online health communities, that can hinder the main objective of these virtual spaces, that is to function as platforms for knowledge acquisition. Second it deepens understanding about the interconnected relations between the concepts of social capital and social support. The study also brings innovation in methods by combining social network analysis and netnography, two naturalistic and online-suited research methods to study online health communities. For practionaires, the results of the study provide significant insights that can be used to program social marketing interventions intended to increase and enhance the quality of social support available in these types of online health communities.

Keywords

Treatment uncertainty; Online health communities; Social capital; Social support, Social marketing.

Table of contents

List of Figures

List of Tables

List of Acronnyms

AASM	Australian Association of Social Marketing
AIDS	Acquired Immune Deficiency Syndrome
BA	Brodmann area
CHD	Coronary heart disease
CNS	Central Nervous System
CVR	Cardiovascular Reactivity
DACC	Dorsal Anterior Cingulate Cortex
E-cigar	Electronic cigarette
E-liquid	Electronic Cigarettes Liquid Solution
ESMA	The European Social Marketing Association
FDA	United Sates Food and Drug Administration
FMRI	Functional Magnetic Resonance Imaging
HPA	Hypothalamicpituitary-adrenocortical Axis
HRT	Hormone Replacement Therapy
ISMA	International Social Marketing Association
MWS	Million Women Study
NKA	Natural Killer Cell Activity
OHC	Online Health Community
OMT	Optimal Matching Theory
PG	Propylene Glycol
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRISMA-ScR	PRISMA Extension for Scoping Reviews
PSA	Prostate-specific antigen test
RQ	Research Question
SNA	Social Network Analysis
SNS	Sympathetic Nervous System
SSBC	Social Support Behavior Code
TMIM	Theory of Motivated Information Management
TNF	Tumor Necrosis Factor
TSR	Transformative Service Research
TVSFP	Television, School and Family Project
UK	United Kingdom
UKDUETs	United Kingdom Database of Uncertainty about the effects of treatments
UMT	Uncertainty Management Theory
URT	Uncertainty Reduction Theory
USA	United States of America
VG	Vegetable Glycerin
VMPC	Ventromedial Prefrontal Cortex
WHI	Women's Health Initiative
WOM	Word-of-mouth

Chapter 1 - General introduction

1.1 Research background and justification

Social marketing is increasingly being advocated as a strategy for influencing healthy behaviors, such as improving treatment adherence and compliance (Futterman et al., 2001; Kanal et al., 2006; Gallivan et al., 2007; Opel et al., 2009; Hightow-Weidman et al., 2011; Rochon et al., 2011; Giordano et al., 2013; Plant et al., 2014). However, in cases where scientific evidence about the risks of health procedures or potential treatments is still lacking or highly uncertain the role of social marketing can be ambiguous. For several health treatments there is considerable scientific and medical uncertainty about the extent to which they can be effective, about the health risks they pose or if the benefits outweigh the harms (Evans et al., 2011). Despite such uncertainties, health authorities often do not emit clear policies regarding such treatments, leaving clinicians and patients with the hard tasks of dealing with treatment uncertainty and making difficult decisions.

Evans and Mccormack (2008) argue that when the outcomes of medical procedures are not certain and there may be benefits but also risks associated with treatment options, social marketing should focus on promoting knowledge acquisition and patients' better-informed decision-making. Inspired by Evans and Mccormack's (2008) assertion and extending their view, this study proposes that in contexts of treatment uncertainty social marketing can focus on promoting social support. Social support, understood as a communicative process aimed at improving individuals' knowledge and feelings of coping, competence, belonging, and/or esteem (Mattson and Hall, 2011), may potentially serve the needs of individuals facing treatment uncertainty and the lack of knowledge and psychological distress that characterize such a condition (Mattson and Hall, 2011; Nolan et al., 2017).

The overwhelming evidence about the positive impact of social support on individuals' physical, emotional, and social well-being (Pan et al., 2018) has fueled the development of many public health interventions designed to improve social support (Uchino, 2009). The question is then how the social support concept can be operationalized in social marketing. This link has not been theoretically established in the literature. Except for a brief one-page article produced by Albrecht(1995), in which the author discusses how social support can help social marketers better adapt to audience needs, the role of social support in social marketing remains very much unexplored in marketing scholarship. Despite the inexistence of a solid theoretical background justifying the operationalization

of social support in social marketing, the fact is that some health-related social marketing programmes do apply social support principles.

Given that no published review is available elsewhere and considering the lack of theory framing social support within social marketing, this study turns to practitioners, by conducting a scoping review of social marketing interventions in the health area that operationalize the concept. This scoping review evaluates how the social support concept was operationalized in social marketing interventions in relation to each of the social marketing criteria defined by Andreasen (2002), namely: behavioral change, consumer research, segmentation and targeting, marketing mix, exchange and competition. It also evaluated which theories or models were used in the reviewed interventions to justify the operationalization of the concept. The scoping review of social marketing interventions operationalizing the concept of social support provides us with a valuable background for the second phase of the research work. This second phase involves the analysis of social support in two specific online health communities (OHCs) were users are subject to treatment uncertainty with the intention of explaining the nature of occurring support interactions and take clues for social marketing interventions intended to enhance the quality and volume of support available in such online communities.

Drawing on social capital theory and adopting a mixed-methods approach, this research deeply examines the nature of online social support, understood as a resource generated through social capital, using a dual case study method involving two OHCs were users face recognized treatment uncertainty: i) an online forum focused on health discussion about electronic cigarettes (e-cigars); and ii) an online forum dedicated to menopausal hormone replacement therapy (HRT) discussion. According to Andalibi et al. (2018), to design and improve social support systems it is important to first understand how people use and experience existing systems and to develop suitable social marketing strategies, marketers need to be aware of consumer insights or actionable findings that can inform future marketing decisions (Longfield et al., 2016). Therefore, the first and main contribution of this research lies in disentangling the intricate nature of online social support interactions within real contexts of treatment uncertainty using two distinct OHCs as case studies to inform social marketing interventions intended to improve the quality and amount of social support available in these virtual spaces. The main topic of the thesis, which is the phenomenon of consumers of uncertain treatments participating in supporting OHCs, can thus be framed under the broader fields of social marketing research and health studies.

OHCs constitute a convenient and increasing commonly used platform for people to connect around shared health experiences, exchange information and provide and receive support, where users interact with peers via multiple communication methods, forming a multi-relational social network (Zhao et al., 2016). In contexts of treatment uncertainty, social support may be difficult to obtain from kin ties, such as family and friends, and health professionals often face difficulties with addressing uncertainty in medicine (Evans et al., 2011). Consequently, prospective consumers of such therapies can turn to peer support in OHCs to fulfil their needs of social support. Peer-to-peer support can be particularly useful for health uncertainty management as peers can provide first-hand experiential information and may be less judgmental and less likely to stigmatize (Brashers et al., 2004). On the other side, OHCs provide a suitable forum for investigating sensitive topics, such as interactions between people facing treatment uncertainty, due to the anonymity afforded to users, which may have a disinhibiting effect (Berdychevsky et al., 2013; Zhang and Yang, 2015).

In the current study, the structural linkages of social capital are understood as conduits for social support resources that are exchanged in OHCs. To analyze social support interactions in the selected OHCs, Nahapiet and Ghoshal's (1998) theoretical framework of social capital was adopted. The framework conceptualizes social capital in terms of three specific dimensions: relational social capital, cognitive social capital, and structural social capital. The relational dimension of social capital refers to the relations people have, the quality of these relationships and how they influence behavior. The main aspects of the relational dimension are reciprocity, trust, norms and obligations and social identification. The cognitive dimension of social capital is focused on unified systems of meaning and representation among actors, involving shared language and accepted narratives among parties. The structural dimension of social capital refers to the structure and the overall patterns of connections that define how actors in a network interact.

Considering the specific context were support interaction takes place (the online environment), the tree dimensions of social capital are researched through qualitative methods, using netnography, which consists in an adaptation of traditional ethnographic methods to suit the online environment (Kozinets, 2002). In addition, social network analysis (SNA), a research method that builds on the principles of graph theory, is applied to examine the network morphology of these online communities, the patterns of social support interaction and the key roles played by individual members in the communities, providing a more complete picture of the structural dimension of social capital and its influence on social support relationships in the OHCs.

Although uncertainty is a key element of health care, it has largely been overlooked in research (Manski, 2019) and there is limited understanding on how public authorities can address the problems it poses for stakeholders of the health system (Han et al., 2011). Previous research has so far explored health uncertainty focusing primarily on individual behavior (e.g. Brashers and Hogan, 2013; Rains, 2014; Rains and Tukachinsky, 2015a; Rains and Tukachinsky, 2015b; Dean, 2016; Logan et. al., 2016; Dean and Davidson, 2018) and not group and community dynamics, thereby neglecting proximal processes of agency that may be important to uncertainty management. In a recent literature review focusing on social network sites and social support, the authors concluded that little research has so far examined social support from a structural perspective beyond network size (Meng et al., 2017). Such scarcity is not surprising given the difficulty in using new methodological approaches, such as the case of netnography and SNA (Webster and Morrison, 2004). In this line, Pan et al. (2017) called for future research that combines qualitative analysis of OHCs, focusing on the content of messages exchange with social network quantitative metrics to analyze users' attention, interests, and intensity of interactions, as well as message quality and content. This study aims to fulfill these research gaps by combining an exploratory phase, were netnography is used to qualitatively evaluate and typify the social support that is provided in the OHCs under study with a quantitative study, were SNA is used to structurally characterize the social network of support relationships established between users.

1.2. Research question and objectives

The proposed study adds to the field of knowledge by addressing the following general research question:

How does social capital influence social support seeking and social support provision behaviors in OHCs in which members face treatment uncertainty?

In addition, the use of sub-questions allows us to address more specific aspects of social support while maintaining focus on the general research question. First, it is considered critical to develop a more complete understanding of the concept of social support and how it can be operationalized in social marketing interventions for health. Therefore, the following pair of research sub-questions guide the initial phase of the research:

RQ1: How have practitioners operationalized the use of the social support concept in health-related social marketing interventions?

RQ2: What is the theoretical reasoning provided by practitioners for using the concept of social support in health-related social marketing interventions?

To answer RQ1, a scoping review extensively evaluates how the social support concept was operationalized in health-related social marketing interventions in relation to each of the social marketing benchmarks defined by Andreasen´s (2002), namely: behavioral change, consumer research, segmentation and targeting, marketing mix, exchange and competition. The scoping review also serves to answer RQ2, by investigating which theories or models were used in the reviewed social marketing interventions to justify the operationalization of the social support concept. Theory can provides a valuable background to social marketing design intervention as theory can strengthen intervention design by helping to identify what influences behavior and the processes of behavior change (Luca and Suggs, 2013; Manikam and Russell-Bennett, 2016; Luecking et al., 2017; Firestone et al. 2017; Basil, 2019).

In the second stage of the research, the study qualitatively evaluates participant behavior to understand how the various dimensions of social capital influence support relationships within the OHCs case-studied, by focusing on the following research questions:

RQ3: How does the structural dimension of social capital, reflected in the patterns of connections between users, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?

RQ4: How does the relational dimension of social capital, expressed by reciprocity, trusting relationships, groups' norms, obligations, and social identification, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?

RQ5: How does the cognitive dimension of social capital, including shared language, codes, and accepted narratives among parties, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?

To answer RQ3, RQ4 and RQ5 a nethnographic study is developed involving both content and thematic analysis of message exchange in the OHCs as well as passive and participant-observation techniques. In this respect, the research is highly exploratory. The most useful interpretations of netnographic data take advantage of its contextual

richness and come as a result of penetrating metaphoric and symbolic interpretation (Kozinets, 1998). As in most studies using netnography, the research starts with these guiding research questions and allows the concrete topics to emerge from the data being analyzed.

Finally, and to complement the netnographic study, we further explore the structural dimension of social capital, by researching the network structure of social support interactions in the two OHCs, focusing on the following research sub-questions:

RQ6 – What are the relevant morphological properties of the networks of social support in these OHCs facing treatment uncertainty?

RQ7 – What are the patterns of social support interaction in these OHCs facing treatment uncertainty?

RQ8 – How can forum users, in these OHCs facing treatment uncertainty, be segmented into homogeneous groups based on the structural positions they occupy in the networks and their profile of social support interaction?

To answer RQ6 the morphological features of the OHCs under study are accessed by computing a set of well-established social network metrics used in similar studies (Xu and Zhang, 2016). To draw more-concrete conclusions, the study also makes a comparison with other OHCs including a forum dedicated to people who have been clinically diagnosed with depressive disorder (Xu and Zhang, 2016), an OHC for smoking cessation (Cobb et al., 2010) and one of the largest and most well-known online forums dedicated to various healthcare-related topics (Vydiswaran et al., 2014). In relation to RQ7, the patterns of social support are evaluated based on Cutrona and Suhr's (1992) social support behavior code (SSBC) scheme that models social support in five basic dimensions: informational, emotional, esteem, network and tangible support. Nonparametric chi-square tests are applied to test for significant differences among the various types of social support. RQ8 aims to typify the roles of users in the OHCs under study. This objective is achieved through a cluster analysis in which the clustering variables reflect both the structural position of members in the networks and members' individual patterns of social support interaction.

Connected with the research questions previously identified, the research objectives are organized into three essays that compose the central chapters of this thesis (chapters 4, 5 and 6). The main objectives of this research are therefore:

Essay 1:

i) to provide an account as to how the social support concept is being operationalized in social marketing interventions in the health area;
ii) To describe which theories or conceptual models are applied in social marketing interventions in the health area to justify the operationalization of the social support concept;

Essay 2:

iii) To understand how structural social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty;
iv) To understand how relational social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty;
v) To understand how cognitive social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty;

Essay 3:

vi) To understand the structure of online social support and the morphological properties of the support networks in these OHCs where users face treatment uncertainty;
vii) To identify the patterns of social support interaction in these OHCs facing treatment uncertainty;
viii) To typify the specific roles fulfilled by users in these OHCs facing treatment uncertainty and to provide a methodology to identify active and influential users.

Transversal with all the objectives previously identified, this research also aims to advance some guiding principles for social marketing interventions focused on promoting health social support or intended to enhance the quality of support available in OHCs where users are subject to treatment uncertainty.

1.3. Contribution of the study

This research contributes to academy and social marketing practice in multiple ways. In terms of contribution to theory the following aspects can be emphasized: First, by reviewing social marketing interventions that operationalize the concept of social support it provides a map of existing practice. As noted by Carins and Rundle-Thiele (2014), social marketing is currently witnessing the development of a truly inclusive transtheoretical, multidisciplinary applied field of practice, thus review studies are strongly encouraged to allow researchers to reflect, drawing on all relevant sources of understanding and knowledge. Considering the lack of theoretical and conceptual literature discussing social support from a social marketing perspective, it is important to evaluate how social marketing health interventions are using the concept for behavior change and the theoretical rational for such option. Second, the study generates knowledge on how virtual communities can serve as platforms of social support for groups of individuals that are subject to uncertainty in treatment outcomes, such as the consumers of e-cigars or women using HRT. To the best of our knowledge, this is the first study to investigate how social support is being used and can be potentiated in situations where the health outcomes of treatments are considered uncertain. Third, by focusing on online communities, the study adds to the current body of literature focusing on health uncertainty, which is mostly focused on individuals' behavior, and not group dynamics. One additional area of significance for this study is the methodological design, which involves SNA and netnography, two research methods that combined provide a suitable and systematic approach to the exploration on online communities. From a managerial practice and policy-maker perspectives, the study provides insights for public health, private and non-for-profit health promotion institutions and managers of the OHCs, that can be used to program community-based social marketing interventions intended to enhance the quality and increase the volume of social support available in OHCs where users may face treatment uncertainty.

1.4. Thesis structure

This section outlines the structure of the thesis. The thesis is composed of 7 chapters that detail as follows. Chapter 1 introduces the background of the research, presents the research justification, the research questions, the objectives to be reached and explains the thesis structure. Chapter 2 reviews the theoretical literature that informs this investigation, including the literature on health uncertainty, social support, social capital and social marketing. Chapter 3 describes, in an integrated manner, the research methodology; this chapter starts by addressing the philosophical standpoint of the

researcher, including the ontological stance and epistemological approach; next, the chapter details the research design, and includes an explanation of the three main research methods applied in the study, scoping reviews, netnography and SNA; the chapter concludes with considerations regarding the quality of the research and methodological procedures by commenting on the study´s reliability, validity and potential for generalization. Chapters 4, 5 and 6 present the essays that constitute the core of the thesis; these three chapters have their own introduction, methodology section (that details the data extraction and data analysis techniques) and a summary of partial conclusions. Finally, in Chapter 7, the main conclusions of the study are presented, as well the study´s contribution to theory and practice, limitations, and recommendations for future research. Figure 1 presents an overview of the thesis structure.

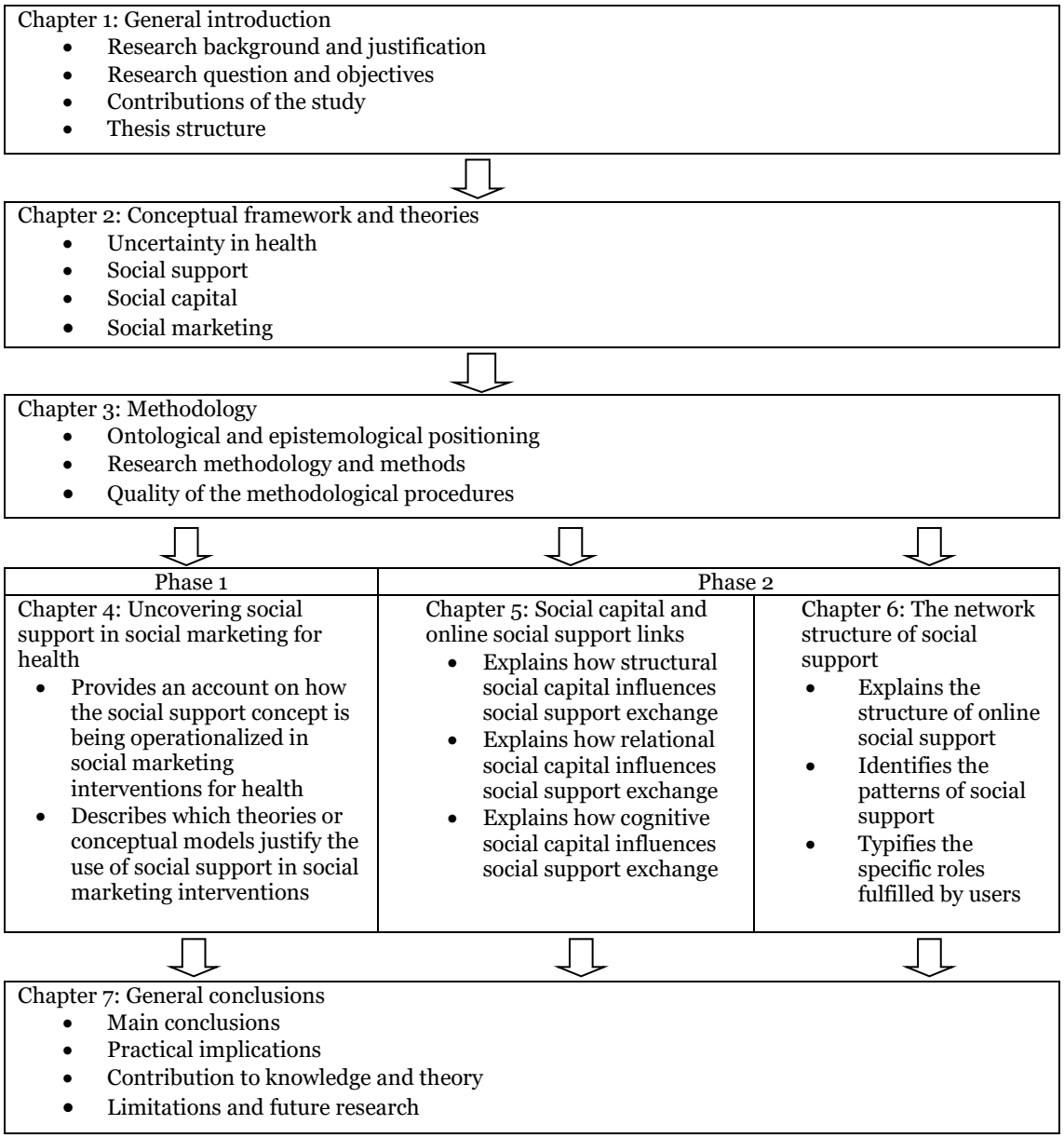

Figure 1 - Structure of the thesis

Chapter 2 – Conceptual framework and theories

The present research is set on the field of social marketing research and health studies and its main purpose is to understand how people facing treatment uncertainty use and experience social support systems in OHCs, using social capital theory as the theoretical framework of analysis. As such, and in order to contextualize this research, this chapter starts with a review of the concept of uncertainty in health. The chapter then moves into an explanation of the concept of social support. Following, social capital theory is reviewed and the link between social capital and social support is established. To conclude, the chapter discusses the discipline of social marketing and the interest in a social marketing approach to the concept of social support.

2.1. Uncertainty in health

2.1.1. Introduction

Uncertainty has been studied from the perspective of various disciplines and areas of study, including economics, marketing, medical sciences, philosophy, psychology and physics (Berger and Bradac, 1982; Urbany et al., 1989; Lipshitz and Strauss, 1997; Shiu et al., 2011; Özkan and Türksen, 2014; Grutters et al., 2015). Although much has been written about uncertainty, rarely has the term itself been explicitly defined (Han et al., 2012). According to Han et al. (2012) at the most fundamental level, uncertainty can be defined as one´s subjective experience of ignorance. For the authors, it is this fundamental perception that explains the multiple manifestations of uncertainty expressed in conventional definitions of the term, such as perceptions of doubt, indefiniteness, indeterminacy, unreliability or a sense of loss of control. Brashers (2001), a prominent researcher in the field of health uncertainty management, states that uncertainty occurs when "details of situations are ambiguous, complex, unpredictable, or probabilistic; when information is unavailable or inconsistent; and when people feel insecure in their own state of knowledge or the state of knowledge in general" (p.478). Also in the health context, Dean and Davidson (2018) define uncertainty as "feeling unsure of what choices to make or actions to take due to a lack of present information about a future event" (p. 122). In the field of consumer behavior, Shiu et al. (2011) assert that uncertainty can be defined as "a condition where the information available deviates from the consumer's ideal information state" (p.585).

Transversal to all the definitions presented is the association between uncertainty and lack of information or imperfect knowledge. For Dieckmann et al. (2017) any expression of uncertainty implies necessarily the presence of imperfect knowledge. Consequently information seeking is a common strategy that people use when attempting to reconcile discrepancies between the amount of uncertainty they feel and the amount they would like to experience (Rains, 2014). However, not all types of uncertainty can be reduced through knowledge acquisition. Aleatory uncertainty (also called objective uncertainty, external uncertainty, random uncertainty, stochastic uncertainty, inherent uncertainty, irreducible uncertainty, fundamental uncertainty, real-world uncertainty or primary uncertainty) derives from the natural variability of the physical world and the randomness in nature and cannot be eliminated or reduced by collecting more knowledge or information (Li et al., 2013). On the contrary, epistemic uncertainty (also known as knowledge uncertainty, subjective uncertainty, internal uncertainty, functional uncertainty, informative uncertainty or secondary uncertainty) origins from individuals' lack of information or knowledge or difficulties in evaluating, measuring or modeling the physical world and, unlike aleatory uncertainty, can be reduced or eliminated given more information (Li et al., 2013).

2.1.2. Health uncertainty

Uncertainty has been identified as an important construct in health and illness and can be experienced in relation to several aspects of the medical condition including diagnosis, disease progression, symptom, patterns and disease prognosis and treatments (Brashers et al., 2004; Dean, 2016). It is uncertainty that leads patients to seek professional health care, justifies medical intervention and motivates medical research (Han et al., 2012).

Building on Lazarus and Folkman's (1984) theory of stress and coping, Mishel (1988, 1990) developed a theory of uncertainty in illness that explains how patients construct meaning for illness events. In her theory, Mishel defined the antecedents of uncertainty in illness as including the stimuli frame, structure providers and cognitive capacity. The stimuli frame incorporates three dimensions: i) symptom pattern, meaning the degree to which illness symptoms have an observable pattern; ii) event familiarity, referring to the existence of recognized cues in illness; and iii) event congruency, which reflects the consistency between the expected disease related events and the events that are experienced. In "structure providers", Mishel includes the actors in the patients' social and professional caregiving networks who serve as resources in interpreting the stimuli frame. Together the stimuli frame and structure providers support the formulation of a

cognitive schema with which individuals interpret the significance of illness events, thereby reducing uncertainty. Mishel's theory of uncertainty in illness also discusses the notion of uncertainty appraisal, characterized by the author as the process of attaching value to the uncertain situation. According to Mishel (1990), uncertainty appraisal is instrumental in determining the extent to which illness uncertainty can affect the wellbeing of an individual, and the perceptions of the individual towards positive development of coping strategies, which are understood as the activities patients use to deal with uncertainty. Mishel (1990) further identifies the sources of patients' experiences of uncertainty in illness, including: i) ambiguity, meaning vague or unclear self-evaluation of the state of illness; ii) complexity, due to the intricacy of cues patients perceive about treatment and the health care system; iii) lack of information, meaning insufficient knowledge from the perspective of patients; and iv) unpredictability, or the lack of stability in the course of one's illness, treatments and outcomes. The main limitation that can be pointed in Mishel's theory is being focused on uncertainty faced by patients with chronic illnesses and not sufficiently exploring other important types of uncertainty in health care, including relational uncertainty, scientific uncertainty and uncertainty from the perspective of other relevant actors in the health system.

In health communication research, Babrow et al., (1998) reviewed individual-psychological models of health uncertainty, studies on linguistic and discourse perspectives on health and illness and sociocultural and historical studies to propose a framework that classifies health uncertainty in five main dimensions: i) complexity, which is caused by multicausality, contingency, reciprocity, or unpredictability due to instability in one´s circumstances, relationships and randomness; ii) qualities of information, including clarity, accuracy, completeness, volume, ambiguity, consistency, applicability and confidence; iii) probability, including one's sense of a specific probability or belief in a range of probabilities; iv) structure of information, meaning its order and integration; and v) lay epistemology, referring to one's beliefs about a phenomenon and also the views of loved ones and health caregivers and researchers. As noted by Han et al. (2012), the strength of Babrow's and colleagues taxonomy rests in its greater comprehensiveness, when compared to Mishel's framework. However, in their article the authors do not define or clarify in detail the conceptual categories of uncertainty they propose.

Brashers et al. (2003) studied the uncertainty experiences by individuals diagnosed with acquired immunodeficiency syndrome (AIDS). Their study supported and expanded Mishel's framework by highlighting three main dimensions of health uncertainty: i) medical uncertainty, which includes insufficient information about the diagnosis,

ambiguity of symptoms and patterns of illness, the complexity of systems of treatment and care and unpredictable disease progression or prognosis; ii) personal uncertainty, referring to the potential impacts of disease on personal roles and financial resources; and iii) social uncertainty implications, such as unpredictable interpersonal reactions and the potential for stigma due to social discrimination, social isolation or the possibility of infecting others.

Studying cancer patients, Kasper et al. (2008) developed an eight-dimensional conceptual model of patient´s uncertainty grouped in three main typologies: i) disease-related uncertainties, including the sub-categories of prognosis, diagnosis and treatment; ii) risk communication uncertainties, including uncertainty in deciphering health information, preferred roles in doctor-patient interactions and physician's trust; and iii) disease coping, including mastering requirements, social integration and causal attribution. Kasper's et al. (2008) framework diverges from Mishel's (1988, 1990), Babrow's et al. (1998) and Brashers' et al. (2003) taxonomies, by being more focused on actions to solve clinical and relational health problems and tasks that arise from health uncertainty management, rather than presenting a comprehensive list of health uncertainty sources.

Arguably the most complete taxonomy of health uncertainty till date was developed by Han et al. (2012). Drawing from Lipshitz and Strauss (1997) research on decision making, the authors first organized health uncertainty according to three dimensions: source (type), issue (domain) and locus (who). They identified three possible sources of uncertainty: i) probability or risk, when available information is limited to or characterized by probability; ii) ambiguity, when information is imprecise, conflicting, passible of multiple interpretations or there is insufficient scientific information; and iii) complexity, when the health phenomenon is difficult to assimilate, for example due to the existence of multiple potential causes, outcomes, effects or interpretive cues.

The second dimension of Han's et al. (2012) framework refers to the domain of uncertainty, meaning its substantive issues, which are subdivided into three categories: scientific, practical and personal. Scientific uncertainty involves uncertainties about diagnosis, prognosis, causal explanations, and treatment recommendations. Practical uncertainty refers to either the structures or the processes of care; examples of structure include uncertainty about the competence of a specific doctor or the quality of care offered in a health institution, and examples of processes include doubts about the responsibilities and procedures that must be followed to access health care. Finally, in personal uncertainty Han's et al. (2012) include psychosocial and existential issues.

Examples of psychosocial uncertainties are the impact of illness in personal relationships or the wellbeing of loved ones, while examples of existential uncertainty include the impact of illness in one's goals or outlook on life.

Han's et al. (2012) taxonomy departs from previous frameworks by specifying a third dimension of uncertainty: its locus, meaning the actor that is under uncertainty, that can be the patient, the doctor, both, or neither. According to the authors, the locus of uncertainty captures the notion that uncertainty is socially constructed and addressed through the interactions of patients and health professionals. As a limitation of Han's et al. (2012) framework, we point the fact that in the locus of uncertainty the authors only discuss uncertainty faced by the patient and the doctor, not considering other actors of the health system, such as patients' family members and friends, other health service providers, government decision-makers, and society in general.

Based on the reviewed frameworks, it is possible to conclude that uncertainty related to treatments is not a monolithic construct. It may result from a variety of factors including informational uncertainty caused by the unavailability of scientific data relating to a treatment (Politi et al., 2013), ambiguity, related to conflicting evidence or the evidence's strength (Dean, 2016; Dean and Davidson, 2018) and stochastic uncertainty, which occurs when randomly determined processes imply uncertainty about treatment outcomes (Politi et al., 2013). Unavailable scientific knowledge concerning a health treatment may cause informational uncertainty. For example, users of e-cigars do not have full information about the long-term health effects of these devices to make thoughtful decisions. Ambiguity uncertainty is related to either conflicting evidence or the evidence's strength. Ambiguity uncertainty may occur when a woman experiencing menopause receives information from her physician that conflicts with the information she was able to find online or in menopause health guidelines publicly available. Stochastic uncertainty occurs when there is uncertainty about future outcomes or possible events related to treatments due to the natural variability of random phenomenon, as it happens in most health treatments, requiring significant sampling to make sure the results are robust. Finally, treatment uncertainty may lead to uncertainty in social relationships (lack of certainty about the support available from keen ties, such as family members and friends and uncertainty in doctor-patient relationships) and personal forms of uncertainty (psychosocial and existential doubts).

This thesis focuses on situations where there is recognized medical or scientific uncertainty about the clinical harms and benefits associated with health treatments. The conceptualization of treatment uncertainty adopted in this research is in line with the

work of the James Lind Initiative (Chalmers et al., 2013) and the UK´s Database of Uncertainty about the effects of treatments (UKDUETs), aimed to identify gaps in medical knowledge and uncertainties surrounding treatment options. Laying out an operable definition of treatment uncertainty, UKDUETs considers uncertainties related with treatments as those questions which cannot be answered by referring to up-to-date systematic reviews of existing research evidence. As such, there may be treatment uncertainty because no up-to-date, reliable, relevant systematic review is available, or because such reviews show that published evidence is incongruent or incomplete and further research is needed (uncertainty continues), as happens at this moment in time, in relation to vaping (e.g. Pisinger, 2015; Liu et al., 2018) and HRT (e.g. Velentzis et al., 2017; Nudy et al., 2019; Vermeulen et al., 2019). Uncertainty in the knowledge of the clinical harms and/or benefits associated with treatments prevents public officials and regulatory decision makers from making accurate assessments of the value of these treatments (Mullins et al., 2010) and complicates decision making for both practitioners and patients. The following sections explain the uncertainty context surrounding vaping and HRT, the selected case-studies for this research.

2.1.3. Electronic cigarettes

E-cigars, also known as personal vaporizers or electronic nicotine delivery systems, are devices that use battery-powered resistances to heat a liquid solution (e-liquids), with varying concentrations of nicotine, propylene glycol (PG), vegetable glycerin (VG), and flavorants, producing an aerosol for the user to inhale (Soule et al., 2016). PG is a compound frequently used as a solvent in aerosolized drug delivery systems such as pressurized metered-dose inhalers and nebulizers for the clinical practice and it is this compound that causes the visible fume during exhalation of e-cigars (Schripp et al., 2012). Contrary to conventional cigarettes, in e-cigars the released compounds are not generated from a combustion process but by direct evaporation, as a vapor (Schripp et al., 2012). For this reason, consuming an e-cigar is known as “vaping” and users frequently refer to themselves as “vapers”. This method of nicotine administration avoids combustion of the substances and the inhaling of smoke, which in the case of conventional cigarettes contains carbon monoxide and other by-products of combustion harmful to health such as benzopyrene, nitrosamines, hydrogen cyanide, benzene, toluene, phenols (Budney et al., 2015).

The e-cigar was invented in 2003, by Chinese pharmacist Hon Lik. Since its introduction to the market, in 2007 (Saddleson et al., 2016), these devices have grown exponentially in popularity and also controversy. Global sales of e-cigars were estimated at 2.8 Billion

USD in 2014, 7.1 Billion USD in 2016 and were projected to reach 44.6 Billion USD in 2024 (Hexa Research, 2016). Estimates indicate that in 2014, 3.7 percent of American adults used electronic e-cigarettes on a regular basis, representing more than 9 million of adult consumers (Blair, 2015). A recent survey in the European Union estimated that around 2 percent of Europeans consume e-cigars (European Comission, 2017).

Supporters of e-cigars argue that these devices help smokers to quit smoking because they replicate the feel of conventional cigarettes (Barbeau et al., 2013; Polosa et al., 2013) and constitute a much less-harmful (though not harmless) way of receiving nicotine (Shahab et al., 2017). Others, such as the World Health Organization (2014), question whether e-cigars are a "gateway" to nicotine, especially for adolescents, and fear that e-cigars may be used by those who might not otherwise have used cigarettes, and that dual use, or transition to cigarette use alone, may follow.

Regulation of e-cigars varies across countries, ranging from no regulation to complete ban. Vaping is expressly prohibited in countries/regions like Singapore, Vietnam, Thailand, Taiwan, Hong Kong Dubai, Cambodia and Mexico (Institute for Global Tobacco Control, 2020). In the USA, the U.S. Food and Drug Administration (FDA) mandates electronic cigarettes products to be regulated similarly to tobacco products; the FDA regulates the manufacture, import, packaging, labeling, advertising, promotion, sale, and distribution of e-cigars (U.S. Food and Drug Administration, 2020). Recently, the U.S. House of Representatives, decided to ban the sale of flavored e-liquids (The New York Times, 2020). In the U.K. e-cigars need to comply with standards that specify the limits of nicotine, the capacity of e-cigars' tanks and packaging and there is also the ban of some e-liquid ingredients, including colorings, caffeine and taurine (Gov.uk, 2020). In Europe, e-cigars follow the same legislation as tobacco products in most E.U. countries, as defined in EU's Tobacco Products Directive (European Comission, 2020), including prohibition to sell to minors, packaging obligations such as the need to include health warnings, a list of ingredients contained in the product, information on the nicotine content, and instructions for use and information on adverse effects, risk groups, addictiveness and toxicity. Exceptions include Norway, were e-cigars can be classified either as medicinal products or as tobacco surrogates - regulation bans the import and sale of nicotine-containing e-cigars, but if the products are classified as medicines, they may be imported for private use (Institute for Global Tobacco Control, 2020).

E-cigars have been characterized by Public Health England as being approximately 95% less harmful than combustible tobacco products (Mckeganey and Dickson, 2017).

However, in a systematic review of 175 studies about the health effects of vaping, Pisinger (2015) indicates very contrasting results; some studies conclude that e-cigars' vapor contains significantly higher quantities of harmful substances when compared with tobacco smoke (particles, harmful metals and carcinogenic nitrosamines), while other studies indicate the opposite. Perhaps important to understand such discrepancies is the consideration that, according to Pisinger, in 34% of the studies he analyzed the respective authors had stated a conflict of interest or described funding. Because of the power, lobbying and influence of big tobacco and big pharmaceutical companies some users of e-cigars seem to believe that there is concerted effort to discredit the comparative health benefits of e-cigars in relation to conventional tobacco products (Satel, 2015). In reality, because e-cigars are a new technology, there are no studies observing the long-term health consequences of vaping, thus the potential harms are still largely unknown (Reuther et al., 2016; Sowles et al., 2016).

2.1.4. Menopausal hormone replacement therapy

Menopause is a normal physiological event in women, occurring at a median age of 51 years (Hickey et al., 2012). It is understood like a menstruation cease, resulting from a disruption in the production of ovarian follicles due to a fall in female hormone production (Souza and Ogava, 2014). Menopause is composed of three distinct stages: perimenopause, menopause and postmenopause. Perimenopause involves the three-to-five years period before menopause, when hormones, estrogen and progesterone levels begin to decrease (Souza and Ogava, 2014). The perimenopause stage is usually characterized by a prevalence of negative health symptoms such as hot flushes, no or infrequent periods, lack of vaginal lubrication, loss of skin elasticity, hormonal changes, night sweats, mood changes, memory and concentration loss, headaches, intensification of bone decalcification, joint and muscle stiffness and reduction of libido (National Institute for Health Excellence, 2017). The menopause itself is understood as a menstruation cease, occurring when women have no menstruation for period for a period of 12 straight months without experiencing other causes, such as illness, medication, pregnancy or breastfeeding (Souza and Ogava, 2014). Postmenopause starts one year after the last menstrual cycle and the health symptoms that might have started in perimenopause can continue through menopause and postmenopause (Women's Health Research Institut - Northwestern University, n.d.).

HRT, also known as menopausal hormone therapy or postmenopausal hormone therapy, is a form of hormone therapy used to relieve menopause symptoms. HRT uses oestrogen (oestradiol, oestradiol 17β, oestrone, or conjugated equine oestrogen) for relieving

menopausal symptoms, combined with progestogen for endometrial protection and tibolone is an oral synthetic steroid preparation with oestrogenic, androgenic, and progestogenic actions that can also be used as HRT (Hickey et al., 2012). Since HRT was introduced, approximately 70 years ago, research produced evidence of both harmful and beneficial effects of this therapy. Before the turn of the century, the effects of HRT were believed to be largely beneficial, owing to a relief of menopausal symptoms, reduction in the risk of coronary heart disease (CHD), osteoporosis, colon cancer and mortality in general (Schierbeck et al., 2012; Lobo et al., 2016).

In the years 2000, two large-scale studies involving randomized clinical trials and produced by the Women's Health Initiative (WHI) (2002; 2004) and the Million Women Study (MWS) (2003), studying older women years after the onset of menopause, showed no such benefits of HRT. On the contrary, these studies indicated an increased risk of CHD and breast cancer development. The WHI study sparked headlines worldwide warning women about HRT (Bluming, 2004), leading to an abrupt decrease in the prescription of HRT, even for women who had severe symptoms of menopause (Lobo et al., 2016). In the years that followed, the results of these clinical trials were highly criticized due to flaws in study's design, including, built in biases, low adherence, high attrition, inadequate power to detect risks for some outcomes, and evaluation of few regimens (Nelson et al., 2012; Bluming, 2004; Whitehead and Farmer, 2004). For example, the WHI study used only a specific regimen of oral conjugated oestrogen (Premarin) versus placebo; thus, other preparations and delivery systems were not tested (Hickey et al., 2012). Subsequent reanalyzes of the WHI data, using age stratification, as well as newer studies suggested a "timing" hypothesis for the benefits and risks of HRT, by observing that for younger women (50-59 years old or within 10 years of menopause) HRT decreases CHD and all-cause mortality and does not have the WHI´s perceived risks including breast cancer (Lobo et al., 2016). Continuing controversies and uncertainty about the health risks of HRT complicate policy making and some clinical decision still hew to the anti-HRT line resulting from the WHI and the MWS studies (Greene, 2019). The reluctance of doctors to prescribe HRT has denied millions of women adequate and effective relief of menopausal symptoms and has impaired their well-being and quality of life (Lobo et al., 2016).

2.1.5. Uncertainty Management

The desire to manage uncertainty arises from the necessity to make decisions, to solve problems, to maintain a coherent identity, and to develop and sustain relationships (Brashers et al., 2004). Individuals generally will feel a desire either to eliminate

uncertainty or to make it more tolerable or manageable (Giordani et al., 2010). Although it is difficult to completely eliminate uncertainty, it is important to recognize and cope with uncertainty to avoid unfavorable hazards (Li et al., 2013). Humans frequently engage in particular strategies to manage uncertainty, and research indicates that information seeking is a key factor in managing health and illness-related uncertainty (Dean and Davidson, 2018).

Several uncertainty management models and theories have been proposed in the literature. In response to natural aleatory uncertainty, probability calculus is the most widely used method and it is based on the principle that an event will occur or has occurred by means of a probability and that the probability value can be obtained based on statistics and random experiments through repeated trials and analysis (Li et al., 2013). Other predominant quantitative methods to deal with uncertainty include fuzzy theory and information-gap theory. Fuzzy theory, initially proposed by Zadeh (1965) and Goguen (1969), provides a framework for modeling human ambiguity and epistemic uncertainty through fuzzy sets with membership functions. Information-gap theory addresses uncertainty by using sensitivity analysis to perturbations in the value of a given estimate of the parameter of interest to represent epistemic uncertainty (Ben-Haim, 2001).

In the field of communication studies, and focused on relational forms of uncertainty, Berger and Calabrese (1975) introduced uncertainty reduction theory (URT) to explain uncertainty in interpersonal communications. URT asserts that when individuals first interact they depend upon information about the other party to reduce relational uncertainty. After gaining such information individuals become able to predict the other party's behavior, an understanding that is considered crucial for the development of interpersonal communication and personal relationships, postulating information seeking as a common strategy for uncertainty reduction. While URT was initially developed in the context of initial interactions, Berger and Bradac (1982) later expanded the theory to include on-going relationships. Based in a comprehensive review of URT, Redmond (2015) identified four main principles that emerge from this theory: i) efforts to reduce uncertainty are linked to the likelihood of future interactions and reward potential, meaning that people mostly invest in reducing uncertainty efforts when they anticipate the need to interact with other person and there is a potential for value from this interaction; ii) uncertainty in initial interactions increases if the other party violates social norms; iii) uncertainty increases when known people violate expectations or act in unexpected ways; iv) uncertainty can be decreased by knowledge acquisition. By

collecting information about one´s self, the relationship and other people individuals reduce self-uncertainty and relational uncertainty.

Equally in the field of communication research and focusing on the relationship between information management and uncertainty, Afifi and collagues (Afifi and Weiner, 2004; Afifi and Morse, 2009) proposed a theory of motivated information-management (TMIM). The theory proposes a three-phase process of uncertainty management in interpersonal encounters consisting in interpretation, evaluation, and decision making. The first stage, interpretation, involves an assessment of uncertainty. In this stage individuals evaluate uncertainty discrepancy, meaning the discrepancy between the level of uncertainty a person feels and the level of uncertainty it desires. In the evaluation stage, individuals assess the possible outcomes resulting from seeking information (outcome assessment) and their capacity to minimize uncertainty through the process (efficacy assessment). In the decision stage people decide to either: i) seek relevant information through direct or indirect methods; ii) avoid information if they consider information seeking to be risky due to the outcome, efficacy beliefs or both, or simply adopt a passive stance of not searching for information; or iii) reappraise the situation by mentally reframing the issue as unimportant, and thereby reducing or eliminating the anxiety caused by uncertainty.

Uncertainty management theory (UMT) is a theoretical framework that explains the processes through which individuals deal with health uncertainty (Brashers et al. 2000; Brashers 2001; Brashers and Hogan 2013). For Brashers (2001) common definitions of uncertainty as negative psychosocial states are inaccurate because they imply that uncertainty always needs to be reduced. In UMT the desire to reduce uncertainty is assumed to be "only one of several possible responses to events and circumstances marked by unpredictability, ambiguity, or insufficient information" (Brashers et al., 2000, p. 64). According to UMT when a person is faced with health uncertainty, a meaning is attributed through a process of appraisal that involves an emotional response. Appraisals of uncertainty can either be positive (e.g. generate feelings of hope or optimism), negative (e.g., danger), neutral (e.g., inconsequential), or involve a mixed response (Brashers, 2001). Consequently, when individuals experience uncertainty, they may respond by trying to reduce their uncertainty, maintain their uncertainty, or even increase their uncertainty (Brashers, 2007). From this perspective, uncertainty does not merely produce anxiety and other negative psychosocial effects but may be a desired state in order to better cope with a health condition. While in URT and TMIM information seeking is understood as a strategy to reduce uncertainty (Berger and Calabrese, 1975; Afifi and Weiner, 2004; Afifi and Morse, 2009), UMT is unique in the recognition that

information seeking can also be intended to willingly increase one's level of uncertainty (Rains and Tukachinsky, 2015b). Managing uncertainty may lead individuals to search for contrary or disconfirming evidence in their attempt to escalate uncertainty (Brashers, 2001). For example, when people appraise uncertainty as offering hope and optimism (e.g. cancer terminal patients), they might feel optimistic or perceive a positive outcome in the uncertain situation (Jiang, 2018) and can engage in information seeking behaviors intended to increase uncertainty. Several empirical studies confirmed UMT's propositions. For example, Vevea and Mille (2010) found that the strategies to manage uncertainty of patients with diabetes ranged from information seeking to actively avoiding information and even treatment, and examining how young adults cope with skin-cancer-related uncertainty Rains and Tukachinsky (2015b) concluded that some patients desired for greater levels of uncertainty.

2.2. Social support

2.2.1. The concept of social support

The concept of social support was introduced into scholarly literature by the seminal work of Caplan (1974) and attracted academic interest after epidemiological research conducted by Cassel (1976) and Cobb (1976), who demonstrated the role of social support in buffering the effects of stress in health and in fostering health coping and adaptation. However, the basilar notion that social interactions have positive effects on well-being have been written about and theorized for centuries. For example, in Darwin's (1871) book *The Descent of Man, and Selection in Relation to Sex*, the geologist described how social instincts lead humans and other animals to take pleasure in the society of its fellows, to feel a certain amount of sympathy with them, and to perform various supportive actions for them, and proposed that natural selection would favor " those communities, which included the greatest number of the most sympathetic members" (p.130). Analyzing the effects of family membership on suicide in catholic and protestant populations, the French sociologist Durkheim (1897) observed that suicide occurred more frequently among individuals who were poorly socially integrated. Durkheim found that suicide rates were higher for single individuals and people without children. A similar focus on social relationships could be observed in sociological research that later resulted in symbolic interactionism theory (Mead, 1934), with its emphasis on the role of repeated social interactions between individuals in the creation and preservation of human societies. Attachment theorists such as Bowlby (1958) theorized about the importance of social relationships for the social and emotional development of infants. According to Bowlby infant behavior associated with attachment is primarily explained

by the need experienced by children to develop a relationship with a primary caregiver, a person that could support the infant in stressful situations. Blau (1960) also proposed a theory of social integration in which some group members, by providing support or services to others, induce respect and reduce others' defensive tendencies, increasing interpersonal attraction and social differentiation.

In 1974, the psychiatrist Gerald Caplan introduced the idea of "support systems" that he defined as "an enduring pattern of continuous or intermittent ties that play a significant part in maintaining the psychological and physical integrity of the individual over time" (pp. 6-7). Studying human interactions in contexts of crisis, Caplan (1974) found that people's health was affected by the level of support they were able to receive from keen ties (such as family members and friends) and also other acquaintances such as community members. Caplan (1974) identified three types of supportive actions in contexts of crisis: i) the mobilization of psychological resources to master socio-emotional burdens; ii) the sharing of tasks and; iii) the provision of assistance in the form of money, materials, tools, skills, and cognitive guidance.

Despite being Caplan (1974) who first introduced the notion of social support, the scientific interest in social support was triggered largely from independent research by two physician epidemiologists, presented in the same year of 1976: John Cassel and Sidney Cobb (Barrera, 1986; House et al., 1988; Uchino et al., 1996; Berkman, 2000; Sarason and Sarason, 2009). Curiously, Cassel's (1976) and Cobb's (1976) methods and findings were very similar. Both authors reviewed extant empirical evidence and concluded about the importance of social relationships and support to the maintenance and promotion of good health. They found that individuals with more restricted or reprehensible social relationships appeared to get health complications more frequently than those with ampler and more abiding relationships. The authors speculated several reasons for this link, but they both emphasized the role of social relationships in buffering the deleterious health effects of psychosocial stress. Cassel focused on the physiological processes mediating the effects of social relationships in health outcomes. Drawing from numerous animal and human studies, Cassel theorized social conditions relevant to health from a functionalist perspective, assigning one category to the factors that promote health, and other to the elements that produce disease. In the first category, Cassel included social support, as a factor that protects people from the physiologic or psychological consequences of stress exposure. Cobb on the other side, applied a communication perspective and resumed evidence showing supportive communication to be protective against the health consequences of various life stresses, conceiving social

support as "information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations" (1976, p.1).

Cassel's and Cobb's studies were fundamental in stimulating new research on the impact of social support on all aspects of health (House et al., 1988) and while the concept of social support started to be extensively studied in the years that followed, there was little agreement among researchers as to its theoretical definition and, as a result, the concept was initially vague, with anything that inferred a social interaction or relationship being classified as indicative of social support (Hupcey, 1998). Quality discussions about the conceptual problems surrounding social support have been provided by several authors, most notably Thoits (1982), Bruhn and Philips (1984), Barrera (1986), Hupcey (1998), and more recently, Williams Barclay and Schmied (2004) and Sarason and Sarason (2009). In general, these authors consider social support as a multi-faceted concept that cannot be defined by a few attributes. Rather, it is the process as a whole that distinguishes social support from related concepts such as caring, social integration, social participation, social ties, social anchorage, social control, social influence, social modelling, social norms or social identity (House, 1987; Due et al., 1999; Berkman et al., 2000; Finfgeld-Connett, 2005). Further problems identified by the previously mentioned authors include the lack of a conceptual definition of social support, a certain bias in the literature favoring the stress buffering explanation for the effects of social support in health, as opposed to direct effects, and difficulties in social support measurement (Williams et al., 2004; Sarason and Sarason, 2009).

While a substantial body of work on the concept of social support has resulted in a large number of definitions, used across disciples and research fields, three basic dimensions of social support are often identified in the literature: i) social embeddedness, which refers to the network connections that individuals have, and that allow support interactions; ii) enacted support, or supporting behavior, referring to the concrete supportive actions that individuals perform, when they render support to a focal individual; and iii) perceived social support, consisting in the subjective perceptions or evaluations of the support that is given or available (Barrera, 1986; Vaux, 1988; Hupcey, 1998). Much of the literature emphasizes the distinction between received and perceived social support. Perceived support refers to the perception or belief that social support is available and provides what is considered needed (Uchino, 2009; Mattson and Hall, 2011). Because perceived social support is based on perception, it is commonly considered a personality trait (Trepte et al., 2018). Received or enacted support is the support that an individual actually receives in terms of what is said, what is given, and what is done for that individual (Mattson and Hall, 2011), comprising instances of

support behavior that the individual has experienced at some time in the past (Barrera, 1986).

As it can be observed in Table 1, definitions of social support are usually centered on the dimensions previously identified. Structural definitions of social support tend to emphasize the nature of individuals' supportive networks, functional definitions typically focus on either perceived support availability, enacted support, or the typologies of support provided (House, 1987; Uchino, 2004; Meng et al., 2017).

Table 1 - Social support theoretical definitions

Author	*Definition*
Structural definitions	
Lin et al. (1979)	"…social support may be defined as support accessible to an individual through social ties to other individual, groups, and the larger community" (p.109)
Thoits (1982)	"The social support system will be defined as that subset of persons in the individual's total social network upon whom he or she relies for socioemotional aid, instrumental aid, or both" (p. 148)
Lin (1986)	"Social support can be operationally defined as access to and use of strong homophilious ties" (p. 30)
Noguchi et al. (2019)	"Social support can be defined as an exchange between persons and is embedded in people's social networks" (p. 2)
Functional definitions - Perceived support	
Cobb (1976)	"Social support is defined as information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligation" (p. 300)
Procidano and Heller (1983)	"…the extent to which an individual believes that his/her needs for support, information, and feedback are fulfilled" (p.2)
Shumaker and Brownell (1984)	"an exchange of resources between two individuals perceived by the provider or the recipient to be intended to enhance the wellbeing of the recipient" (p. 11)

Table 1 - Social support theoretical definitions (cont.)

Author	*Definition*
Functional definitions - Perceived support (cont.)	
Albrecht and Adelman (1987)	"verbal and nonverbal communication between recipients and providers that reduces uncertainty about the situation, the self, the other, or the relationship, and functions to enhance a perception of personal control in one's life experience" (p.19)
Functional definitions - Enacted support	
Caplan (1974)	"Both enduring and short-term supports are likely to consist of three elements: the significant others help the individual mobilize his psychological resources and master his emotional burdens; they share his tasks; and they provide him with extra supplies of money, materials, tools, skills and cognitive guidance to improve his handling of his situation" (p. 6)
Cohen and Syme (1985)	"Social support is defined as the resources provided by other persons" (p. 4)
Langford et al. (1997)	"the assistance and protection given to others, especially to individuals" (p.95)
Finfgeld-Connett (2005)	"Social support is an advocative interpersonal process…that is centered on the reciprocal exchange of information and is context specific" (p. 5)
Mattson and Hall (2011)	"a transactional communicative process, including verbal and/or nonverbal communication, that aims to improve an individual's feelings of coping, competence, belonging, and/or esteem" (p.184)
Functional definitions - Perceived and Enacted support	
Gottlieb (2000)	"process of interaction in relationships which improves coping, esteem, belonging, and competence through actual or perceived exchanges of physical or psychosocial resources" (p.28)
Gottlieb and Bergen (2010)	"The social resources that persons perceive to be available or that are actually provided to them by nonprofessionals in the context of both formal support groups and informal helping relationships" (p.512)

Table 1 - Social support theoretical definitions (cont.)

Author	*Definition*
Functional definitions - Typologies of support provided	
House (1981)	Social support is an interpersonal transaction involving one or more of the following: (1) emotional concern (liking, love, empathy), (2) instrumental aid (goods or services), (3) information (about the environment), or (4) appraisal (information relevant to self evaluation)" (p. 39)
Schaefer et al. (1981)	"social support can have a number of independent components serving a variety of supportive functions…Emotional support includes intimacy and attachment, reassurance, and being able to confide in and rely on another-all of which contribute to the feeling that one is loved or cared about, or even that one is a member of the group, not a stranger. Tangible support involves direct aid or services and can include loans, gifts of money or goods, and provision of services such as taking care of needy persons or doing a chore for them. Informational support includes giving information and advice which could help a person" (p. 385-386)
Cutrona and Suhr (1992)	"…support intended communication behaviors fall into five categories: informational support (providing information about the stress itself or how to deal with it), tangible aid (providing or offering to provide goods or services needed in the stressful situation), emotional support (communicating love or caring), social network support (communicating belonging to a group of persons with similar interests and concerns), and esteem support (communicating respect and confidence in abilities)" (p. 159)

Source: Own elaboration

The question of how social support is defined is a relevant one, since the conceptual definition has implications for social support measurement (Wortman, 1984). Structural perspectives of social support are focused on the physicality of support and usually adopt a quantitative approach to measurement, based on social networks. For House and Kahn

(1985) structural aspects of social support emphasize the analysis of the structure of support relationships as opposed to the mere existence of their functional content. According to Thoits (1995) structural approaches emphasize the organization of people's ties, the number and frequency of relationships, their social roles and the density and multiplicity of relationships among network members. On the other side, functional approaches typically focus on qualitatively assessing or quantitatively measuring the quality of support available (Meng et al., 2017) in terms of the specific functions or typologies of social support and in the context of particular stressors (Cohen, 1988; Taylor, 2011).

In a review of social support definitions conducted by Williams et al. (2004) the authors considered that a contextualized approach to the definition of social support is necessary to improve clarity in research. This same idea is expressed by Taiminen and Taiminen (2016) who argues that the research context should define how social support is interpreted, because the concept cannot be applied usefully to all situations. Considering the context of the present study, we highlight the definition proposed by Albrecht and Adelman (1987) that identify social support as "verbal and nonverbal communication between recipients and providers that reduces uncertainty about the situation, the self, the other, or the relationship and functions to enhance a perception of personal control in one's life experience" (p. 19). According to these authors, social support affects uncertainty by encouraging perspective shifts on cause-effect contingencies or by enhancing perceptions of control through skill acquisition, tangible assistance, acceptance or assurance, and opportunities for venting. Missing from Albrecht and Adelman' (1987) interpretation of the concept of social support and its relationship with uncertainty management, is the recognition that social support can, in some situations increase one's uncertainty, instead of reducing it, as explained by uncertainty management theorists (Brashers et al. 2000; Brashers 2001; Brashers and Hogan 2013). For example, new information brought by a support provider can increase the number of alternative options available, imposing difficulties in choice processes, or new information can contradict previous assumptions assumed by the receiver, increasing ambiguity and leading people to question their own state of knowledge.

2.2.2 Taxonomies of social support

Since the 1980s, researchers have moved away from considering social support a unitary concept, and attempted to increase the specificity of the term by identifying its core components (Wortman, 1984). Various taxonomies of social support have been proposed, with considerable similarity among the various typologies. Table 2 compares

several frameworks available in the literature, highlighting the overlap of its various categories.

Table 2 - Typologies of social support

Subtype of social support	Authors		
	Pinneau (1975)	Brandt and Weinert (1981), Personal Resource Questionnaire	Norbeck et al. (1981), Social Support Questionnaire
Esteem		Intimacy: "there is someone I feel close to who makes me feel secure" (p. 278); Worth: "people let me know I do well at my work (p.278)	Affirmation: "the affirmation or endorsement of another person's behaviors, perceptions, or expressed views" (p. 265)
Emotional	Emotional: "information which directly meets basic social-emotional needs" (p. 2)	Assistance: "the availability of informational, emotional, and material help" (p. 277) (repeated below). Nurturance: "to be giving and caring" (p. 278)	Affect: "the expression of positive affect of one person toward another" (p. 265)
Informational	Appraisal or information: "a psychological form of help which contributes to the individual's body of knowledge or cognitive system, for example, informing the person about a new job opportunity, explaining a method for solving a problem" (p. 2)	Assistance: "the availability of informational, emotional, and material help" (p. 277) (repeated above)	
Tangible	Tangible: "assistance through na intervention in the person's objective environment or circumstances, for example: providing a loan of money or other resources" (p. 2)	Assistance: "the availability of informational, emotional, and material help" (p. 277) (repeated above)	Aid: "the giving of symbolic or material aid to another" (p. 265)
Network Support		Social integration: "I spend time with others who have the same interests that I do" (p. 278)	
Social Companionship			

Table 2- Typologies of social support (cont.)

Subtype of social support	Authors		
	Schaefer et al. (1981)	Barrera and Ainlay (1983), Inventory of Socially Supportive Behaviors	Cohen and Hoberman (1983), Interpersonal Support Evaluation List
Esteem			Self-esteem: “perceived availability of positive comparison when comparing one’s self to others” (p. 104)
Emotional	Emotional support: "includes intimacy and attachment, reassurance, and be- ing able to confide in and rely on another-all of which contribute to the feeling that one is loved or cared about, or even that one is a member of the group, not a stranger" (p. 385)	Intimate interaction: “traditional nondirective counseling behaviors such as listening; and expressing esteem, caring, and understanding” (p. 136)	
Informational	Informational support: "includes giving information and advice which could help a person solve a problem and providing feedback about how a person is doing." (p.386)	Guidance: “offering advice, information, or instruction” (p. 136); Feedback: “providing individuals with feedback about their behavior, thoughts, or feelings” (p. 136).	
Tangible	Tangible support: "involves direct aid or services and can include loans, gifts of money or goods, and provision of services such as taking care of needy persons or doing a chore for them” (p.385-386)	Material aid: “providing tangible materials in the form of money and other physical objects” (p. 135); Behavioral assistance: “sharing of tasks through physical labor” (p. 136)	Tangible: “intended to measure perceived availability of material aid" (p.104)
Network Support			Belonging: “the perceived availability of people one can do things with” (p. 104); Appraisal: “the perceived availability of someone to talk about one’s problems” (p. 104)
Social Companionship		Positive social interaction: “engaging in social interactions for fun and relaxation” (p. 136)	

Table 2- Typologies of social support (cont.)

Subtype of social support	Authors		
	Cohen and Wills (1985)	Jacobson (1986)	Barling et al. (1988)
Esteem	Esteem: "information one is esteemed and accepted" (p. 313)		
Emotional		Emotional: "refers to behavior that fosters feelings of comfort and leads to believe he or she is admired, respected, and loved, and that others are able to provide caring and security" (p. 252)	Emotional: "sympathy, listening, and caring" (p. 142)
Informational	Informational: "help in defining, understanding, and coping with problematic events" (p. 313)	Cognitive: "information, knowledge, and/or advice that helps to understand his or her world and to adjust to changes within it" (p. 252)	Informational: "general advice on ways to approach problems" (p. 142); Appraisal: "an objective evaluation of [the] situation, appropriate social comparisons, and an acknowledgement of the difficulties faced" (p. 142-143)
Tangible	Instrumental: "provision of financial aid, material resources, and needed services" (p. 313)	Materials: "refers to goods and services that help to solve practical problems" (p. 252)	Instrumental: "helpfulness in taking care of the numerous time-consuming activities" (p. 142)
Network Support			
Social Companionship	Social companionship: "spending time with others in leisure and recreational activities" (p. 313)		

Table 2- Typologies of social support (cont.)

Subtype of social support	Authors		
	Rodriguez and Cohen (1998)	Cutrona and Russell (1990)	Cutrona and Suhr (1992), Social Support Behavior Code
Esteem		Esteem: "The bolstering of a person's sense of competence or self-esteem by other people, for example, giving positive feedback on his or her skills and abilities or expressing a belief that the person is cable of coping with a stressful event" (p.322)	Esteem Support: "communicating respect and confidence in abilities" (p.159)
Emotional	Emotional: "involves the expression of empathy, caring, reassurance, and trust, and provides opportunities for emotional expression and venting" (p.536)	Emotional: "The ability to turn to others for comfort and security during times of stress, leading the person to feel that he or she is cared for by others" (p.322)	Emotional support: "communicating love or caring" (p.159)
Informational	Informational: " refers to the provision of relevant information intended to help the individual cope with current difficulties and typically takes the form of advice or guidance in dealing with one's problems" (p.536)	Information: "Providing the individual with advice or guidance concerning possible solutions to a problem"(p.322)	Informational support: "providing information about the stress itself or how to deal with it" (p. 159)
Tangible	Instrumental: "involves the provision of material aid, for example financial assistance or help with daily tasks" (p.536)	Instrumental: "Delivering concrete resources to help another individual cope with a stressful situation" (p.322)	Tangible aid: "providing or offering to provide goods or services needed in the stressful situation" (p.159)
Network Support		Network: "Feeling part of a group with common interests and concerns" (p.322)	Social network support: "communicating belonging to a group of persons with similar interests and concerns" (p.159)
Social Companionship			

Source: Own elaboration

Considering the multidimensional nature of the concept, and drawing from previous frameworks, Cutrona and Suhr (1992) proposed a social support behavior code (SSBC) that models social support into five basic dimensions (Table 3). Informational support provides facts, advice, guidance or feedback, whereas emotional support involves expressions of affection, concern, empathy or sympathy. Esteem support shows a positive regard for the recipient's skills, abilities, and intrinsic value. Network support consists of promoting a sense of membership or belonging. Finally, tangible support is conceived as providing goods and services to the recipient.

Table 3 - Social support behavior code (SSBC)

Support Type	Purpose of communication
Emotional support	
Relationship	Stresses the importance of closeness and love in relationship with the recipient
Physical affection	Offers physical contact, including hugs, kisses, hand-holding, shoulder patting
Confidentiality	Promises to keep the recipient´s problem in confidence
Sympathy	Expresses sorrow or regret for the recipient's situation or distress
Listening	Attentive comments as the recipient speaks
Understanding/empathy	Expresses understanding of the situation or discloses a personal situation that communicates understanding
Encouragement	Provides the recipient with hope and confidence
Prayer	Offers prayer for the recipient
Informational support	
Suggestion/Advice	Offers ideas and suggests actions
Referral	Refers the recipient to other source of help
Situation appraisal	Reassesses or redefines the situation
Teaching	Provides detailed information, facts, or news about the situation or about skills needed to deal with the situation
Esteem support	
Compliments	Says positive things about the recipient or emphasizes the recipient´s abilities
Validation	Expresses agreement with the recipient's perspective on the situation
Relief of blame	Tries to alleviate the recipient´s feelings of guilt about the situation
Network support	
Access	Offers to provide the recipient with access to new companions
Presence	Offers to spend time with the person, to be there
Companions	Reminds the person of availability of companions, of others who are similar in interests or experience
Tangible assistance	
Loan	Offers to lend the recipient something (including money)
Direct task	Offers to perform a task directly related with the stress
Indirect task	Offers to take over one or more of the recipient´s other responsibilities while the recipient is under stress
Active participation	Offers to join the recipient in action that reduces the stress
Willingness	Expresses willingness to help

Source: (Cutrona and Suhr, 1992, p.161)

In a review of studies examining social support messages shared online among individuals coping with illness, conducted by Rains et al. (2015), the authors found that the majority of studies used the SSBC as a framework for conducting qualitative content analysis of support messages. Cutrona and Suhr's (1992) SSBC presents the advantages of being divided into several sub-categories and was developed based on surveying

existing social support measures and descriptions of social support in research literature, providing a more complete, complex and detailed measure of social support. For these reasons, the SSBC was adopted in this study. However, it is recognized that this framework was not specifically developed to analyze social support interactions in contexts of health uncertainty, thus there may be other important dimensions of social support not captured in the model.

2.2.3. Adequacy of sources and types of social support

Social support can be provided by diverse actors, both in one's informal network (e.g. spouse or partner, other family members, friends, neighbors) and in more formal helping networks (e.g. peer support in self-help groups, health care professionals, co-workers, caregivers, public service providers) (House, 1981; Heaney and Israel, 2008). Intimate ties are usually more fitted for emotional/esteem types of support, while other, more formal, relationships are better suited for informational types of support (Gottlieb, 2000). For example, in medical care settings, patients often need emotional support from friends and family members and informational support from doctors and other professionals of the health care system (Heaney and Israel, 2008).

Thoits (1995) explains that the provision of social support is likely to be more effective when the provider is someone who shares comparable stressors because of the empathic understanding of the support provider that makes the support provision more aligned with the needs of the receiver. In fact, evidence confirms that when people are under extreme distress, peers who shared similar experiences are in a better position to provide useful support (Wortman, 1984). In sensitive situations, like the ones characterized by treatment uncertainty, social support can come from weak ties, such as casual acquaintances and online peers in OHCs. Pena and Quintanilla (2015) point out that such weak ties provide complementing viewpoints, objective and constructive feedback with reduced role obligations and without evoking the social apprehensiveness that might come from attempting to share emotions in face-to-face interactions. Online peer support appears to be particularly useful for uncertainty management, as people that share the same health condition are less likely to be judgmental or to stigmatize (Brashers et al., 2004). Moreover, not all types of social support are equally effective for each particular context. Only when relationships provide the appropriate forms of support will they operate to reduce distress and influence subsequent health outcomes (Wortman, 1984). Optimal matching theory (Cutrona, 1990; Cutrona and Russell, 1990), which will be addressed next, relates de suitability of different types of social support with the nature of the stressors people are experiencing.

Optimal matching theory (OMT) (Cutrona, 1990; Cutrona and Russell, 1990) posits that certain types of social support are more suitable to cope with specific kinds of stressful events. The theory assumes that the benefits and the deleterious effects of social support result from the matching or mismatching of support with the nature of stress (Merluzzi et al., 2016). Cutrona and Russell (1990) proposed a model that distinguishes four basic characteristics of stressors (desirability, controllability, life domain, and duration of consequences) and considered two broad categories of social support, namely, action-facilitating support (including informational and tangible support) and nurturant support (involving emotional, network, and esteem support). According to the authors the most influential stressor is the lack of controllability. The model posits that action-facilitating types of support are appropriate for conditions that involve stressors more controllable, whereas nurturant support is suitable for coping with contexts characterized by highly uncontrollable events. In relation to the desirability dimension, Cutrona and Russell consider that desirable events in which stress results from uncertainty in goal attainment produce feelings of anxiety and that undesirable events can produce depression. Consequently, OMT postulates that social support that helps to soften anxiety is more effective to cope with positive events and social support that alleviates depression is more suitable to cope with negative events. However, Cutrona and Russell do not clearly specify which types of social support may help to soften anxiety or alleviate uncertainty. Green-Hamann and Sherblom (2014) suggest that negative events, such as a personal illness, may necessitate more emotional support and that desirable events, such as a new career opportunity, may require more informational support. In relation to the duration of consequences, OMT assumes that the longer the effects of the stressor last, the more people need nurturant support (to bolster morale) and facilitating types of support such as informational and tangible support to deal with the situation. Finally, and in relation to life domain stressors, the theory posits that the nature of the implied loss affects the required typology of support; for example, the loss of one´s assets may imply the need for tangible support, whereas the loss of a relationship may require the need for social support that facilitates feelings of attachment and social integration. Some empirical evidence validates OMT – Rains et al. (2015) conducted a meta-analytic review of 41 studies examining social support and found that informational and emotional support messages were the most common and that certain types of social support were more frequently associated by specific stressors.

2.2.4. Social support and health

Since the introduction of the concept in health studies, several other disciplines have found value in better understanding the effects of social support in human well-being,

including, for example, psychology (Chay, 1993; Tetrick et al., 2000), sociology (Wellman and Wortley, 1990; Turner and Marino, 1994), education (Wall et al., 1999; Wilcox et al., 2005), and social work (Letourneau et al., 2004; Msengi et al., 2015). Nonetheless, the main interest in social support is motivated by its relationship to physical and mental health (House, 1987; Hobfoll et al., 1990), hence the concept has received great attention in health psychology and behavioral medicine (DiMatteo, 2004).

Several reviews of empirical research concluded for a positive relation between social support and human health and well-being (Hogan et al., 2002; Uchino, 2006; Mazzoni and Cicognani, 2011; Taylor, 2011; Nurullah, 2012; Paterson et al., 2013; Silva and Loureiro, 2014; Barton et al., 2015; Gariépy et al., 2016; Brunelli et al. 2017; Smith et al., 2017; Ali et al., 2018; Teoh and Hilmert, 2018; Wang et al., 2018). Well documented health outcomes of receiving social support include psychological adjustment, improved adherence and increased efficacy of medical treatments, better coping with illness uncertainty, reduced stress and depressive symptoms, increased resistance and recovery to disease, mitigation of the risks of suicide and reduced mortality (Cassel, 1976; Cobb, 1976; Barrera, 1986; Thoits, 1986; Heitzmann and Kaplan, 1988; Mattson and Hall, 2011; Nolan et al., 2017; Li et al., 2019; Spence et al., 2019).

Of particular importance was the finding that support ties are a more powerful predictor of health and longevity than well-established risk factors, such as smoking, blood pressure, lipids, obesity, and physical activity (Taylor, 2011). Research also indicates that giving social support may lead to beneficial effects on well-being, such as increased happiness, self-esteem and self-worth (Inagaki, 2018; Dam et al., 2019; Barnes and Nolan, 2019; Sharda et al., 2019) and a study developed by Brown et al. (2003) found that mortality was significantly reduced for individuals who reported providing support to friends, relatives, neighbors and spouses. Considering the results of all these empirical studies relating social support with improved health, the question then becomes of what may be the specific pathways through which social support affects health.

The theoretical background explaining the positive effects of social support in health consists in two basic theories: the relational regulation theory and the stress and coping theory. In 1985 Cohen and Wills established a distinction between social support stress buffering effects and social support main effects in health, and this distinction has since played an essential role in shaping research and theory (Lakey and Orehek, 2011). The stress and coping theory understands social support as a response tool for dampening or protect against stress (Cohen and Wills, 1985; Barrera, 1986; Thoits, 1986). The relational regulation theory reports a main-effect model, in which social support is

considered to improve health, irrespective of whether people are under stress, through relational influences (Lakey and Orehek, 2011).

The stress and coping theory, also referred to as the "stress-buffering" model, has been thoroughly developed and become dominant in social support research (Barrera, 1986; Lakey and Orehek, 2011). Social support theorists such as Cassel (1976) and Cobb (1976) were particularly concerned with the role of social support in the prevention of disease. They suggested that social support facilitates coping and adaptation by acting as a moderator of the pathogenic influence of stressful events. Social support is said to play a role at two different stages of the causal chain relating stress to illness: first, the perception that others will provide support redefines the potential for harm posed by a stressful situation and increases one's self-confidence to cope with imposed demands, preventing an event from being appraised as stressful; second, social support intervenes between the experience of stress and the onset of the pathological outcome by providing a solution to the problem or by reducing the perceived relevance of the event (Cohen and Wills, 1985)

The alternative model, the relational regulation theory (also known as the "main-effect", or "direct-effect model") was developed based on statistical evidence that social support benefits health independently of stress (Cohen and Wills, 1985; Thoits, 1985; Procidano, 1992; Finch et al., 1999). Initially, researchers attributed the main effect model to regularized social interaction or embeddedness in social roles and adherence to medical prescriptions (Cohen and Wills, 1985; Thoits, 1985). According to this theoretical view, supportive networks can provide individuals with positive emotional experiences and a set of stable and socially rewarded roles, reducing role ambiguity, leading to a sense of predictability and stability in one's life situation, and a recognition of self-worth, social integration, relational rewards or status (Cohen and Wills, 1985). For example family living has been proved to be associated with a broad spectrum of healthy behaviors, including reduced probability of drugs use, alcohol abuse and smoking, and an increased likelihood of a balanced diet and good sleep habits, while social isolation has been related with unhealthy responses to stress, including smoking and alcohol consumption (Holahan and Moos, 1981; Broadhead et al., 1983; Taylor, 2011). Social support has equally been related with improving treatment adherence and compliance with medical regimens, and healthy lifestyles, such as exercise, healthy eating and not smoking (e.g. Futterman et al., 2001; Gallivan et al., 2007; Keller et al., 2012; Plant et al., 2014).

Evidence for both types, direct and buffering effects, has emerged. However, measures of social integration show direct correlations with mental and physical health, with no

buffering effects (Thoits, 1995). According to Taylor (2011) the fact that structural measures of social integration are associated with mental and physical health supports the notion that the mere perception of social support plays a role in health and that the activation of supportive ties may not be essential for health benefits. Besides, when support acts (enacted support) are not recognized by the recipient (perceived support), stress protective effects were also found (Bolger and Amarel, 2007) confirming that social support can be "invisible" to the recipient (Taylor, 2011) and still produce favorable health outcomes.

Despite existing theories, the precise biological pathways by which social support leads to health benefits and the factors that moderate and mediate this relationship are still not completely understood (DiMatteo, 2004; Gale et al., 2018; Szkody and McKinney, 2019; Wilson et al., 2020). To explain this relation research has mostly focused on the effects of social support on the endocrine (hormonal), cardiovascular, neural and immune systems (Pressman et al., 2005; Eisenberger et al., 2007; Ditzen and Heinrichs, 2014; Teoh and Hilmert, 2018; Morese et al. 2019).

In order to examine the buffer effect of social support in biological stress response, several hormonal mechanisms have been examined. Perceived social support has been associated with reduced autonomic activation, including reduced norepinephrine and epinephrine levels (Fleming et al., 1982; Seeman et al., 1994). In the presence of stress, the body produces catecholamines epinephrine and norepinephrine with concomitant sympathetic nervous system (SNS) stimulation and may also engage the hypothalamicpituitary-adrenocortical (HPA) axis, with the release of corticosteroids such as cortisol (Taylor, 2011). These body responses have short-term protective effects under stressful situations, but with recurrent activation, they can result in negative health effects due to increases in blood pressure and heart rate, abnormal heart rhythms and neurochemical imbalances (Taylor, 2011). Thus, some literature suggests the potential role of hormonal responses involving the release of oxytocin in the physiological benefits of social support, as oxytocin is associated with reduced SNS and HPA axis reactions to stress (Taylor et al., 2002). However, results on the link between perceived social support or social integration and various endocrine parameters are inconsistent, with various studies showing no relevant effects on cortisol release (eg. Luecken et al., 1997; Evans and Steptoe, 2001; Evolahti et al., 2006; Karb et al., 2012).

Autonomic activation can also be assessed through indirect markers, such as heart rate or blood pressure, consequently studies started to evaluate the effects of social support in the cardiovascular system (Ditzen and Heinrichs, 2014). The cardiovascular reactivity

hypothesis is based on the principle that social support may be beneficial by buffering the potentially harmful influences of stress in cardiovascular reactivity (Uchino, 2006). People showing exaggerated cardiovascular reactivity (CVR) to stress are at higher risk of developing cardiovascular diseases (Lepore, 1998; Treiber et al., 2003). Several empirical studies indicate that the presence and companion of supportive individuals, such as a family member, a partner, or a friend, when someone is going through a stressful time, can reduce cardiovascular responses to stress (e.g. Kamarck et al., 1990; Christenfeld et al., 1997; Angerer et al., 2000; Knox et al., 2000; Hernandez et al., 2014; Freeborne et al., 2019). Nonetheless, evidence is not conclusive since other studies showed no effect of social support on CVR (Gallo et al., 2000; Craig and Deichert, 2002; Christian and Stoney, 2006) and an experimental study even found that social support can increase CVR reactivity (Hilmert et al., 2002). After a comprehensive review of empirical research and based on the inconsistencies in empirical findings, Teoh and Hilmert (2018) proposed a dual-effect model for the effect of social support on cardiovascular reactivity in which social support is supposed to decreases CVR when people receiving social support are more engaged in a task and social support elevates CVR when receivers are less engaged.

According to the proponents of the neural system pathway, central nervous system (CNS) mechanisms modulate the effects of social support on buffering stress responses through the brain areas responsible for social motivation and stress reactivity (Eisenberger et al., 2007; Ditzen and Heinrichs, 2014; Morese et al., 2019). Studies using functional magnetic resonance imaging (FMRI) did found that social support was associated with neurocognitive reactivity, including diminished activity in the dorsal anterior cingulate cortex (DACC) and Brodmann area (BA) 8 in the dorsal superior frontal gyrus, in a way that supported individuals showed reduced neurocognitive reactivity to social stressors, which, in turn, was associated with reduced neuroendocrine stress responses (Eisenberger et al., 2007). Other areas of the brain that may be affected by social support include the ventromedial prefrontal cortex (VMPC), which is related to safety signals. Research found that the simple fact of seeing pictures of an attachment figure (a person that provides a sense of safety and security) when individuals feel pain triggers VMPC activation (Eisenberger et al., 2011), suggesting that social support might also exert its neuro effects by means of conditioned safety signals (Ditzen and Heinrichs, 2014).

A final biological pathway that has been suggested for explaining the association between social support and health is through the immune system (Pressman et al., 2005). Stress increases the risk for adverse health outcomes by affecting the immune system in ways that leave people more vulnerable to diseases and infections (Taylor, 2011). Diverse

immune related parameters have so far been investigated, including social support effects on natural killer cell activity (NKA), tumor necrosis factor (TNF) levels, and cytokine levels, leading researches to conclude that social support may also protect against immune related disorders and promote healthy responses to influenza vaccine (Uchino, 2006; Taylor, 2011; Ditzen and Heinrichs, 2014).

It is known that all these systems (cardiovascular, neural and immune) influence each other as they all share CNS mechanisms as their basis and feedback regulator (Taylor, 2011), leading Ditzen and Heinrichs (2014) to suggest an integrated model in which social support affects health through safety signaling and threat processing in the CNS and the periphery of the body, reducing cardiovascular and immune forms of biological stress reactivity. In resume, despite the extensive evidence relating social support with health, the exact physical pathways by which social support leads to beneficial health outcomes are still under investigation.

2.2.5 Social support and uncertainty

In their influential book, *Communicating Social Support*, Albrecht and Adelman (1987) suggest several processes through which social support facilitates uncertainty management, including encouraging perspective shifts on cause-effect contingencies, enhancing perceptions of control through skill acquisition, tangible assistance (instrumental support), acceptance or assurance, and offering opportunities for ventilation. According to the authors, through these processes, social support reduces uncertainty about the situation, the self, the other, or the relationship, and enhances a perception of personal control in one's life experience.

In his review of uncertainty in acute illness literature, Mishel (1997) indicates social support as one of the important predictors of illness uncertainty, and concludes that social support can directly influence the indeterminacy, complexity and unpredictability of the illness uncertainty experience. Most research reports an inverse correlation between social support and uncertainty. For example, studying adolescents diagnosed with cancer, Neville (1998) found an inverse relationship between perceived social support and illness uncertainty and a positive relationship between uncertainty and psychological distress. In another study, Lin et al. (2010) discovered that social support reduces parental uncertainty and encourages illness coping for Taiwanese parents of children with cancer. Kang (2011) studied the relationships between uncertainty and its antecedents, including education, social support and symptom frequency in Korean patients with atrial fibrillation, concluding that illness uncertainty in patients was

predicted by social support and symptom frequency and that social support was significantly associated with less uncertainty. Similarly, Li et al. (2019) found that illness uncertainty was negatively correlated with support availability for hospitalized patients with systemic lupus erythematosus. In a qualitative study, Brashers et al. (2004), the proponents of UMT, found that social support helps people with human immunodeficiency virus (HIV) to manage uncertainty by: i) assisting with information seeking and avoiding; ii) providing tangible assistance; iii) facilitating skill development, by encouraging the person with HIV to develop coping skills; iv) giving acceptance or validation; v) allowing ventilation; and vi) encouraging perspective shifts, including reappraisal of uncertainty. Taken together, these studies suggest that social support can facilitate uncertainty management. However, social support is not without costs.

Some of the potential negative consequences of support exchange for the recipient, include inappropriate advice, social control, unwanted attention, invasion of privacy, social confrontation, reduced self-efficacy, weakening of goal efforts and increased stress (Taylor, 2011; Gale et al., 2018; Reijnders et al., 2018; Gray et al., 2019; Palant and Himmel, 2019; Zee and Kumashiro, 2019). In addition, research indicates that those that provide support to others, due to the demanding nature of their roles, can also face negative health consequences, including depressive symptoms, psychological distress, emotional strain, anxiety and stress (Brashers et al., 2004; Barnes and Nolan, 2019; Dam et al., 2019; Sharda et al., 2019). As noted by Gottlieb and Bergen (2010), ongoing unidirectional support, such as the support provided by family members to a person in need, can be highly burdensome depending on the outlay of psychological and tangible resources involved (time, emotional effort or economic means). All these factors can obscure the contribution of social support to health uncertainty management.

According to Brashers et al. (2004), the experience of uncertainty and the ways that social support may be used to manage uncertainty have both general cross-situational components and context-specific particularities. Hence the importance of studies such as this, that analyze the particular ways in which online social support may aid in uncertainty management for people facing treatment uncertainty, the strategies adopted by the users of the OHCs, and the potential complications that may arise from seeking, providing, and receiving social support in an online environment.

2.3. The theory of social capital

2.3.1. Introduction

The health and well-being of individuals is influenced by the personal relationships and the social structures which are created among people (Lewis et al., 2013). Such elements have been captured in the concept of social capital. The origins of the concept can be traced back to classical sociology of the 19th century, but the concept has gain scholarly interest with the writings of social theorists Pierre Bourdieu (1986) and James Coleman (1988, 1990), and was catapulted from its academic origins to a much broader discussion, gaining widespread popular and interdisciplinary recognition, with Robert Putnam's (1993) research on the importance of social capital for institutional performance of Italy's local governments institutions and Putnam's (2000) survey on the decline of social capital in the USA (Kreuter and Lezin, 2002). Other relevant theoretical contributions have been put forward by Burt (1992), Portes (1998, 2000), Nahapiet and Ghoshal (1998) and Lin (2000, 2001).

Historically, social capital has been approached from either a cultural or a structural perspective (Han et al., 2012; Murayama et al., 2012; Coll-Planas et al., 2017). Whereas the cultural perspective (also known as the "cognitive" approach or the "social cohesion" approach) is related with values, norms, beliefs and attitudes (Bourdieu, 1986; Coleman, 1988; Coleman 1990; Putnam, 1993; Putnam, 2000), the structural dimension (also known as the "network approach") is mostly focused on the notion of networks of social capital (Burt, 1992; Portes, 1998; Lin, 2000; Portes, 2000; Lin, 2001). To allow for a better understanding of these different approaches, and in order to clarify the various ways social capital has been conceptualized by its main theorists, a brief review of social capital literature will be provided next.

2.3.2. The cultural view of social capital

The cultural view of social capital suggests that interpersonal relationships are the basis of social capital, which are said to create value for individuals by providing resources that can be used for achieving people's desired outcomes (Han et al., 2012; Murayama et al., 2012; Coll-Planas et al., 2017). Being primarily concerned in understanding how individuals improve their economic situation, and the dynamics of power in capitalistic societies, French sociologist Bourdieu (1986) framed social capital as the pool of personal resources originated in one´s relationships that auxiliate the individual to navigate the social field in order to access other forms of capital (economic, symbolic, and cultural).

As such, Bourdieu (1986) defined social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (p.248). For Bourdieu social classes in capitalistic societies are based on principles of differentiation, which are defined by the author as the "properties within the social universe in question that are capable of conferring strength to those who possess them" (p.724). Individuals are hierarchically organized in capitalistic societies based on the volume and composition of the resources that are valued in such societies. The amount of social capital possessed by a given actor results from the network of connections the individual can mobilize and from the volume of the capital (economic, cultural or symbolic) possessed by each person to whom the actor is connected. Through one´s social networks, social capital provides the actual or potential resources that would otherwise be unavailable or very difficult to obtain, constituting a mean for social mobility. However, since the resources accessible by one's network of relationships are determined by the resources that are collectively retained by the social group, Bourdieu believed that social capital can inhibit social mobility in some circumstances - for example, if one's network of relationships provides resources that are devalued or stigmatized by a society (e.g. criminal organizations) such resources may obstruct upward mobility. In general Bourdieu's view of social capital were eminently centered on the individual and were aligned with the sociological tradition, where social capital is seen as individual resources that result from participating in a network of social relationships.

A second influential perspective was offered by Coleman (1988), who defined social capital as follows: "Social capital is defined by its function. It is not a single entity, but a variety of entities with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors within the structure" (p.302). Coleman suggested that the value of social capital is constituted by the outcomes it produces in social interactions. To demonstrate the characteristics of social capital, Coleman recurred to various examples of social interaction, highlighting the benefits social capital provides to the actors. These examples include: market exchanges, where social capital provides trustworthiness through mutual interests; political action, where social capital promotes the organization of individuals; societies or communities, in which social capital provides a normative structure and regularity to interactions; and interpersonal communication, where social capital allows for access and diversity of information. Based on these examples, Coleman identified three basic dimensions of social capital: i) obligations, expectations and trustworthiness of structure; ii) the capability of the social structure to provide information channels; and iii) norms

combined with effective sanctions that encourage or constrain actions that exist in social relationships. Through obligations, expectations, and trustworthiness, social capital provides members of a network with a notion of generalized reciprocity that allows for relationships to be established. Second, by providing information channels social capital creates the conditions for collective action and resource mobilization through production and sharing of collective knowledge. Third, with norms and effective sanctions, social capital functions to solidify and ensure that expectations in social relationship are achieved. Coleman further explained that norms and sanctions provide structure and stability to social interactions, while also encouraging group members to act in favor of collective interests. From this explanation, it is possible to infer that, although Coleman included elements of the structural view in his theory, his work was basically grounded on a cognitive perspective since he was mostly focused on the mental processes associated with the concept of social capital. On the other side, and similarly to Bourdieu, Coleman also viewed social capital as a mean to increase personal resources; thus, his perspective was mainly focused on individual-level outcomes. However, several aspects of social good are emphasized in Coleman's writings, such as the notions of collective action, knowledge, and interests. Coleman's theory can be seen as a bridge between the individualistic approach of Bourdieu (1986) and the collective perspective of social capital, that is the basis of Putnam's (1993, 1995) view on social capital.

Putnam's (1993) study of Italian local government institutions is regarded as pivotal within the collective approach to the concept of social capital. In his work the author conceptualized social capital as belonging to groups rather than individuals, and defined it as: " the features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions" (p. 167). For Putman (1993) societies with high levels of social capital are characterized by social participation, trust in others and reciprocity, enhancing social interactions between individuals and favoring cooperation, with group benefits. Especially relevant is Putnam's (1995) differentiation between bonding and bridging social capital. Bonding social capital refers to trusting and cooperative relations within homogeneous groups involving the strong ties established between members of a network who are similar in terms of socio-demographic characteristics or status, such as a family unit or a group of friends. On the other side, bridging social capital provides a way for people to connect with individuals and groups of dissimilar status expanding people's access to a wider range of resources. Later, in one of his works, Putnam presented another definition of social capital making explicit the norm of reciprocity and the importance of social networks, while framing social capital as having both private and public externalities – in this later work, he

defined social capital as "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p.19). Translating the notion of bonding and bridging social capital to a network perspective, and building on Granovetter' (1973) research on tie-strength, Putnam (2000) then redefined bonding social capital as reflecting the bonding that occurs between closely tied members of a community and that foster the building of trust among close network members, and bridging social capital as relating to the linking of different and isolated groups within the same community that facilitate the access to resources outside the community, implying inclusiveness and diverseness. Finally, the author also recognized some of the potential negatives aspects of bonding and bridging social capital. For Putnam (2000) bonding social capital provides substantial in-group resources and contributes to a strong sense of group loyalty, trust and social cohesion, but can also generate antagonism towards non-group members. On the other side, bridging social capital provides access to a broad set of out-group resources, but complicates social cohesion and group identity. More recently, and complementing Putnam's notions of bonding and bridging social capital, Simon et al. (2003), introduced the concept of linking social capital, which refers to the vertical social capital ties established between actors with different hierarchical power within a certain community or society.

2.3.3. The structural view of social capital

The structural dimension of social capital is focused on the networks of relationships and the institutions that link people and groups together (Stone, 2001). Portes (1998) was among the first authors to underscore the importance of social networks in social capital by defining social capital as "the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (p. 6). For this author social capital does not inhere in the individual, but is instead a property of the individual's set of relationships with others, and, as such, social capital translates the capacity of individuals to command scarce resources by virtue of their membership in social networks or broader social structures.

Network theory influenced the social capital perspective of several structuralist authors. Lin (2001) presented a full developed network theory of social capital by focusing on social ties between individuals and defined social capital as an "investment in social relations with expected returns in the marketplace" (p.19). For the author society could be viewed as a market in which individual actors exchange resources. Lin observes that social ties between individuals allow the flow of information and in contexts of imperfect social markets some social ties, which are more valuable, can provide individuals with

opportunities that would be otherwise unavailable, conferring people with social credentials and generating a return for the actor. Lin argues that through investments in social relationships and through social networks in general, an actor may capture other actors' resources (e.g. their wealth, power or reputation) for attaining its personal goals. Lin also differentiated between two distinct dimensions of social capital resources: its capacity (accessed resources) and actual uses for particular actions (mobilized resources). While "accessed" social capital estimates the degree of access to social capital resources or the extent to which a potential pool of resources capable of generating returns is available to the actor, mobilized social capital reflects value in use, meaning social ties and its resources that are actually used for the production or in consumption in the marketplace.

The American sociologist Ronald Burt is arguably among the most influential theorists of the structural view of social capital. Burt´s theoretical positioning is similar to Lin´s (2001) in the sense that he also describes social capital in terms of social ties and social networks. However, Burt focused more on the specific network mechanisms and networks structures of social capital (Burt, 1992; Burt, 2000; Burt, 2001; Burt, 2005). Burt (2000) defined social capital as "the advantages that individuals or groups have because of their location in social structures" (p.347), and explained the concept of social capital in terms of a "metaphor" of advantage in which the position an actor occupies in the network structure defines his social capital and allows for competitive advantages in pursuing his ends. Much of Burt´s discussion is rooted in social network theory and his "metaphor" of social capital includes three dimensions: i) networks models of contagion, referring to the influence of peer behavior in conforming one´s behavior through a process of social contagion; ii) network mechanisms of prominence, in which the network prominence of individuals or organizations signal the quality of resources they possess; and iii) network models of range, including here the notion of "closure" – networks with high closure are highly connected, so that no one can escape the notice of others; and the notion of "brokerage" – a brokerage position in the network occurs when the actor becomes a broker spanning "structural holes" between unconnected actors in the network. These two network positionings are related with Putnam's (1995) bonding and bridging social capital. Structural holes are gaps between nodes or denser subgroups in a network (Burt, 1992). Structural holes reflect the absence of direct ties (bonding social capital) in a network. In an actor's (ego's) network, structural holes exist when ego's contacts are indirectly connected through ego but do not have direct ties themselves. As a result, egos are exposed to non-redundant information and resources from these contacts (Pan et al. 2017), reflecting access to bridging social capital. The main

novelty in Burt´s theory is a breach with Coleman's (1990) perspective that social capital results from internal group closure, by considering that social capital is more a function of brokerage across structural holes (Burt, 1992). Nevertheless, Burt (2005) asserts that the two networks models of range can be brought together in a productive equilibrium within a general model of social capital in which structural holes would be the source of value added (access to new information, opportunities and skills), and network closure (group cohesion, good communication and coordination) would be essential in realizing the value made possible through the structural holes.

2.3.4. Multi-dimensional view of social capital

An overview of the various definitions of social capital presented so far is resumed in Table 4. These definitions and the theories that support them imply differentiated approaches, and levels of analysis. Still, there are some common grounds in the theories analyzed. First, although theorists can be framed under the cultural or the structural perspectives of social capital, most recognize that social capital is a multi-dimensional concept that includes components from both perspectives. Second, despite the tendency of theorists of social capital to focus in a specific level of analysis, they also assume that social capital exists and can be found at different levels, including a micro level (focused on relationships between individuals), a meso level (involving institutions and organizations) and a macro-level (e.g. regions or nations). While the cultural perspective of social capital started by focusing on the individual (Bourdieu, 1986), and progressively turned towards a collective-dominant perspective with the work of Coleman (1988), and later with Putnam (2000), the structural perspective of social capital is eminently individual-centered since it defines the concept of social capital in terms of the resources that are embedded within individual's social networks, being regarded as a property of individuals (Murayama et al., 2012). This focus of the structural perspective on the micro-level is evident in some of the theories of social capital proposed by the structuralist theorists that we have discussed and their focus on individual egos, dyadic relationships and actor´s positioning in the social networks (Burt, 1992; Burt, 2000; Burt, 2001; Lin, 2001; Burt, 2005). Finally, most authors assume that social capital is based on social structures that are built on relationships between actors and that these structures offer some type of competitive advantages for the participants by facilitating the access to potential or actual resources.

Table 4 - Summary of social capital definitions

Author	Social Capital Definition
Bourdieu (1986)	"the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (p.248)
Coleman (1988)	"Social capital is defined by its function. It is not a single entity, but a variety of entities with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors within the structure" (p.302)
Putnam (1993); Putnam (2000);	" the features of social organization, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions" (p. 167); "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (p.19)
Portes (1998)	"the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (p. 6)
Lin (2001)	"investment in social relations with expected returns in the marketplace" (p.19)
Burt (2000)	"the advantages that individuals or groups have because of their location in social structures" (p.347)

Source: Own elaboration

Instead of focusing on either the cultural or the structural view of social capital, this study adopts the framework of social capital proposed by Nahapiet and Ghoshal (1998), which is credit for providing a multidimensional view of social capital. Among the different frameworks available for studying social capital, that of Nahapiet and Ghoshal is largely preferred for its robustness and its completeness as it includes the core elements discussed in social capital literature (Maurer and Ebers, 2006; Pedrini et al., 2016). Nahapiet and Ghoshal (1998) defined social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (p. 243). In Nahapiet and Ghoshal's conceptualization social capital comprises both the network and the assets that may be mobilized through the network. The authors proposed a model that integrates a structural dimension, expressed by network ties, network configurations, and organization, and a cultural one, focused on shared cultural codes, language and meanings, trust, norms, reciprocity, obligations and social identification. Furthermore, Nahapiet and Ghoshal's framework of social capital can both be applied at the individual

and at the collective levels. More specifically, the model was developed by the authors in the context of knowledge sharing in organizational contexts, but the authors explicitly refer that it can also be applied to study individual social capital in varied settings: “we suggest that the model outlined here also provides the foundation of a viable framework to guide the investments - individual or collective- of practitioners seeking to build or extend their network of connections and, therefore, their stocks of social capital” (Nahapiet and Ghoshal, p. 262). Given that the current study examines individuals interacting in OHCs, this research is grounded on the individualistic approach to social capital. As such, our point of departure considers social capital as the resources or potential resources embedded within, available through, and derived from the network of relationships possessed by an individual. The social structure here is the OHC and the key social capital outcome explored is peer-to-peer social support.

Nahapiet and Ghoshal's (1998) framework conceptualizes social capital in terms of three specific dimensions: structural social capital, relational social capital and cognitive social capital (Figure 2). The structural dimension of social capital deals with the overall patterns of connections that define who and how actors in the network interact. The most important aspects in this dimension are the nature of network ties connecting actors, network morphology, and the roles of network users. The relational dimension of social capital is based on the concept of "relational embeddedness", which reflects the particular relations people have, the quality of these relationships and how they influence behavior. The key facets of the relational dimension are trust, reciprocity, norms, obligations and identification. The critical resources of the cognitive dimension of social capital are shared language/codes and shared narratives, all contributing to unified systems of meaning and representation among parties. In resume, and applying the framework to OHCs, the structural dimension of social capital determines the extent and range of social support resources available to an actor, the relational dimension focuses on the quality and accessibility of these social support resources and the cognitive dimension refers to the capability of online users to develop a mutual interpretative framework, within which social support interactions can occur.

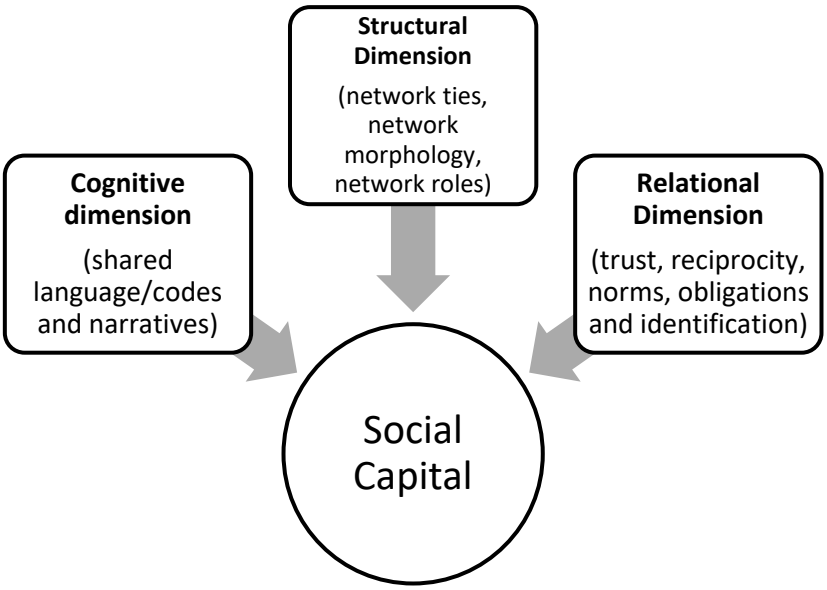

Figure 2 - Nahapiet and Ghoshal's model of social capital
Source: Based on Nahapiet and Ghoshal (1998)

2.3.5. Social support and social capital

The theory of social capital can be used as a practical framework for exploring support interactions in online communities (Ellison et al., 2007; Ryan et al., 2008; Loane and D'Alessandro, 2013; Green-Hamann and Sherblom, 2014; Bae, 2015; Pan et al., 2017). Loane and D'Alessandro (2013) identify social capital as resources embedded in social structures and consider that in online communities such resources include social support, which is said to be available to individual participants through acts of generalized reciprocity, facilitated by trust. According to Drentea and Moren-Cross (2005) online communities provide social capital in that it is an embedded community asset activated for purposeful action. The social support created from such reserves of social capital can be realized by individuals or may simply come to exist as potential resource to be tapped at some point in the future, if the person ever needs (Mathwick et al., 2008).

Pan et al. (2017) advocate the view that social capital can take the form of social support since social capital it is the basis for emotional, tangible and informational forms of assistance. As such, social support is not only a substantiation but also an outcome of social capital because the latter provides individuals with resources or connections to receive social support from network members when needed (Resnick, 2001). On the other side, the time, limited attention, and resources users invest when providing social support online can be viewed as invested social capital, which, in return, is expected to

generate support reciprocity, as a reward for investments of social capital (Pan et al. 2017). Wellman and Espinoza (2001) suggested the concept of "network capital", as a form of social capital in which relationships with network members provide social support, including emotional aid, material aid, information, companionship, and a sense of belonging. These authors further assert that social support is one of the main ways by which network members obtain resources to deal with daily life, seize opportunities, and manage uncertainty.

In the present research it is assumed that social support constitutes an output of social capital. The structural linkages of structural social capital are understood as conduits for social support resources that are exchanged between forum users in the OHCs under study and it is assumed that the relational dimension of social capital (quality of relationships) and the cognitive dimension of social capital (unified systems of meaning) determine the characteristics of support interactions on the OHCs. Thus, to analyze social support interactions in the selected OHCs Nahapiet and Ghoshal's (1998) tridimensional theoretical framework of social capital was adopted in this research.

2.4. Social marketing

2.4.1. Introduction

Drawing on its parent discipline of commercial marketing, which largely drew on economics and psychology, social marketing has become an important research field and evolved over the years into a discipline in its own right (Buyucek et al., 2016). The salient characteristic of social marketing is that it takes learning from commercial marketing and applies it to the resolution of social problems (Stead et al., 2007). The principle of applying commercial marketing techniques to solve social issues can be traced back to Wiebe's (1951) research on the use of radio and television to "sell" social concerns or causes to people. Wiebe evaluated four social programs in the USA and concluded that when the promotion of the social initiatives resembled a commercial marketing campaign, the program was more successful. In result of his observations, Wiebe asserted that commercial marketing can move people "into interaction with social mechanisms" (p.680) that could lead to social change. Wiebe's interrogation: "Why can't you sell brotherhood and rational thinking like you sell soap?" (p. 679) has since become one of the most popular quotes in social marketing literature.

Despite being highly cited, the importance of Wiebe's (1951) article to the social marketing discipline is very modest, the main problem being overfocused on the

promotional dimension of marketing. Historians of social marketing such as French (2015) argue that rather than being considered as one of the founding seminal articles of the discipline, Wiebe's paper should be viewed as a simple statement, that resonated well within academia in the 1950's, that large audience media channels can "sell" social behaviors. In fact, until the 1980s, the integration of societal objectives and marketing was relatively straightforward and simplistic, with a primary focus on promotional and communication activities (Evans and McCormack, 2008).

The term "social marketing" was formally introduced to academia by Kotler and Zaltman's 1971 classical article, published in the Journal of Marketing titled *Social Marketing: An Approach to Planned Social Change*. In their article the authors characterized social marketing as "the design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research" (p.5). According to Kotler and Zaltman (1971), social marketing, similarly to generic marketing, is not a theory in itself. Rather, it is a framework or structure that draws from many other bodies of knowledge to understand how to influence people's behavior in the search for societal good. The introduction of social marketing at that precise moment in time was a logical development within the Northwestern School, in their attempt to broaden the marketing paradigm, to make the discipline more socially relevant (Elliott, 1991). The marketing paradigm broadening in the 1970´s, leaded by Kotler and various co-authors, such as Levy and Zaltman, expanded the boundaries of marketing from its conventional focus on business activities to a broader perspective embracing all forms of human activity related to any generic or social exchange (Shaw and Jones, 2005).

Years later, Andreasen (1994) redefined the scope of social marketing by proposing the following definition: " Social marketing is the application of commercial marketing technologies to the analysis, planning, execution and evaluation of programs designed to influence the voluntary behavior of target audiences in order to improve their personal welfare and that of society" (p. 110). Two key attributes in this definition shaped the current understanding of social marketing. First, Andreasen adds to Kotler and Zaltman's (1971) definition by observing that social marketing should influence not only "social ideas", but also attitudes and behaviors and introduced the notion of voluntary behavior change, implying that social marketing is not about coercion or enforcement. Second, there is the implied principle that, contrary to commercial marketing, social marketing is not intended to benefit the organization that promotes the marketing actions, but rather to benefit individuals' welfare or promote societal good. Furthermore, the emphasis on society as well as on the individual implies another fundamental aspect

about social marketing: it can apply not only to the behavior of individuals, but also to that of professionals, organizations and policymakers, meaning the contextual actors that can influence individuals' behavior change (Gordon, Mcdermott, Martine and Angus, 2006). According to Cherrier and Gurrieri, (2014), this turn from traditional downstream and micro-marketing approaches towards ecological perspectives, which account for change at the micro, meso and macro level has been pivotal in social marketing development.

Traditional downstream social marketing focuses on the micro-level, and places the responsibility for change in the individual (Russell-Bennett et al., 2013). Midstream social marketing refers to community-based interventions, focused at the meso level and involving collaborations with community actors (people and organizations) and personal networks such as family and friends as means to achieve change (Luca et al., 2016). An example of a social marketing intervention with a midstream component is the project *5-4-3-2-1 Go!*, an intervention that targeted community areas in Chicago, USA, with high obesity prevalence (Evans et al., 2007; Evans et al., 2011). The project included a "Chat and Chew" component consisting in focus groups with community leaders, service providers, and residents to gain support to the project. Upstream social marketing focuses on the macro system, by concentrating efforts on decision-making groups or individuals who have an influence over a target audience such as governments, politicians, regulators and other decision-makers (Cherrier and Gurrieri, 2014). An example of an upstream intervention is provided by the *Move More Diabetes*, a project targeting American adults with diabetes, that, among other activities, addressed community policy to improve access to health care. The focus on a multilevel approach is present in current definitions of social marketing. For example, in October 2013, the International Social Marketing Association (ISMA), the European Social Marketing Association (ESMA) and the Australian Association of Social Marketing (AASM) endorsed a comprehensive definition of social marketing, which states that:

> Social Marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviors that benefit individuals and communities for the greater social good. Social Marketing practice is guided by ethical principles. It seeks to integrate research, best practice, theory, audience and partnership insight, to inform the delivery of competition sensitive and segmented social change programmes that are effective, efficient, equitable and sustainable.(p.1)

As it can be inferred from the various definitions of social marketing discussed so far, social marketing is traditionally a program-oriented discipline. From the early beginning theorists of social marketing revealed a concern with the application of social marketing principles to program interventions (Kotler and Zaltman, 1971). Authors such as Andreasen (1994) considered social marketing to be "programs designed to influence the voluntary behavior of target audiences to improve their personal welfare and that of the society of which they are part" (p. 110) and Grier and Bryant (2005) define social marketing as being essentially a " program-planning process" (p.321). The question then becomes of what constitutes a social marketing intervention. This essential question will be addressed in the next section.

2.4.2. Social marketing benchmarks

Despite the several definitions of social marketing offered in seminal literature, one difficulty was defining what constitutes a social marketing program (Stead et al., 2006; Firestone et al., 2017) and what elements could potentially improve the impact of an intervention (French and Blair-Stevens, 2005). Considering this difficultly, and to establish a distinction between social marketing and alternative social approaches, such as social advertising, social media marketing, social policy or education (Russell-Bennett et al., 2019), Andreasen (2002) proposed a scheme of six social marketing benchmarks that provides a basic structure for social marketing interventions. The six benchmark criteria proposed by Andreasen include behavioral change, formative research, segmentation, the use of the marketing mix, the principle of exchange and competition. The details of Andreasen's (2002) social marketing benchmarks are provided in Table 5. Alternative frameworks of social marketing benchmarks were proposed by other authors, including French and Blair-Stevens (2005), Robinson-Maynard et al. (2013) and Xia et al. (2016). However, we found them to be extensions of Andreasen's (2002) benchmarks, some missing conceptual clarity and others not being suitable for the purposes of the present study.

Table 5 - Andreasen's social marketing benchmark criteria

Benchmark	Explanation
1. Behavior Change	Intervention seeks to change behavior and present specific measurable behavioral goals.
2. Consumer Research	Formative research is conducted to assess the needs of the target group.
3. Segmentation & Targeting	Interventions demonstrated segmentation and targeting. Strategy is tailored for the selected segment/s.
4. Marketing Mix	Intervention considers the best strategic application of the four Ps of the 'marketing mix', including 'product', 'price', 'place' and 'promotion'. Other Ps commonly used in social marketing include "policy", "people" and "partnership".
5. Exchange	Intervention considers what will motivate people to engage voluntarily with the intervention and offers them something beneficial in return.
6. Competition	Careful attention is paid to the competition faced by the desired behavior. Intervention considers the appeal of competing behaviors (including current behavior) and uses strategies that seek to remove or minimize this competition.

Adapted from Andreasen (2002)

Table 6 compares Andreasen's (2002) original framework with these alternative social marketing benchmark schemes. Kubacki et al. (2015) have critically noted how *consumer orientation* and *insight*, new benchmarks introduced by French and Blair-Stevens (2005), are not easily distinguishable in their framework, lacking conceptual clarity. In relation to Robinson-Maynard's and collegues scheme (2013), it includes some criteria that are not related with the essential features of social marketing interventions, such as the necessity of related academic articles describing the interventions to be peer-reviewed. Xia's et al. (2016) benchmarks add unnecessary complexity that is not relevant for the present research, for example by decomposing Andreasen's (2002) original benchmark of "consumer research" into multiple distinct benchmarks: primary formative research, secondary formative research and pre-test research. These drawbacks and the practicability of the original framework proposed by Andreasen's (2002), may explain why this particular scheme is still largely preferred by researchers over alternative schemes (e.g. McDermott et al., 2005; Stead et al., 2007; Carins and Rundle-Thiele, 2014); Kubacki et al., 2015; Dietrich et al., 2016; Kubacki et al., 2017; Krzysztof et al., 2019). Research has shown that social marketing interventions are more likely to achieve behavior change when more of Andreasen's (2002) benchmarks are used (Gracia-Marco et al., 2011; Carins and Rundle-Thiele, 2014).

Table 6 - Comparison of Andreasen's social marketing benchmark criteria with alternative benchmark frameworks

Andreasen's (2002) original framework	Alternative Social Marketing benchmark schemes		
	French and Blair-Stevens (2005)	Robinson-Maynard, Meaton and Lowry (2013)	Xia, Deshpande and Bonates (2016)
Behavior Change	Behavior and behavioral goals		
Consumer Research	Customer orientation; Insight driven	Formative research; pre-testing; questionnaire/ in-depth interviews; understanding concept of the target audience's environment	Primary formative research; Secondary formative research; Pretest research
Segmentation & Targeting	Segmentation & Targeting	Segmentation and targeting; further segmentation; Upstream targeting	Segmentation; Partnership
Marketing Mix	Marketing Mix	Marketing Mix; multimedia initiative	Core product; Actual product; Augmented product; Price reduction; Place; Promotion
Exchange	Exchange analysis	Incentives	
Competition	Competition analysis Theory based and informed	Disincentives	Behavioral competition
		Relationship building	
		Clear benefits	
		Measurable/stand up to scrutiny; Systematic analysis of own results; Biases and flaws in data collection	Monitoring research; Evaluation research
		Sustainability support systems	

Source: Own elaboration

A relevant criteria not included in Andreasen's (2002) benchmark scheme and contained in French and Blair-Stevens's (2005) framework is the use of theory to understand behavior and inform social marketing interventions. Theory can help practitioners to understand the social system that influence behavior change, to explain relationships between different factors that impact on behavior change, to improve the efficacy of interventions and to make predictions and generalizations for similar phenomena by tracing the theoretical pathways by which social marketing achieves behavior change

outcomes (Luca and Suggs, 2013; Manikam and Russell-Bennett, 2016; Luecking et al., 2017; Firestone et al. 2017; Basil, 2019).

2.4.3. Social marketing and health uncertainty

Social marketing has grown in usage within the public health community (Grier and Bryant, 2005) and is increasingly being advocated as a strategy for influencing healthy voluntary lifestyle behaviors, such as improving diet, increasing exercise, tackling the misuse of substances like alcohol, tobacco and illicit drugs, and improving medicine adherence (Gordon, et al., 2006; Stead et al., 2007; Firestone et al., 2017). However, in situations characterized by ambiguity, where the scientific or medical information about a specific health procedure or treatment is lacking, or the outcomes are highly uncertain, the role of social marketing can be questioned. In such conditions, Evans and Mccormack (2008) advocate social marketing efforts destined to improve patient´s level of information and facilitate decision-making. The authors exemplify their argument using the case of prostate-specific antigen (PSA) test. Screening for prostate cancer using the PSA test is controversial because of the medical and scientific uncertainty about the potential harms associated with this type of test and its relationship with morbidity and mortality (Barry and Simmons, 2017). According to Evans and Mccormack, when the patient understands the nature of the disease or condition being addressed; understands the clinical service and its likely consequences, including risks, limitations, benefits, alternatives, and uncertainties, he is in a better position to make a decision. The authors further assert that their view is consistent with the current patient-centeredness movement, which seeks to adapt health care to individual patient needs and expectations, by facilitating informed decision-making based on each patient's unique situation, values and preferences.

Inspired by Evans and Mccormack's (2008) assertion and extending their view, this research proposes that in contexts of treatment uncertainty social marketing can focus on promoting social support. As we have seen in previous sections, the concept of social support is broader than knowledge acquisition. Besides informational support, which is intrinsically related with the principle of knowledge acquisition, social support provides emotional, esteem, network and tangible forms of assistance (Cutrona and Suhr, 1992). The underlying rationale for suggesting that social support benefits people facing uncertainty in treatment outcomes derives from the principle that social support allows individuals to better cope and that this enhanced coping will result in improved decision-making and fewer negative psychosocial effects commonly associated with uncertainty, such as stress, emotional distress, anxiety, depression and loss of control (Cassel, 1976;

Cobb, 1976; Barrera, 1986; Heitzmann and Kaplan, 1988; Mattson and Hall, 2011; Nolan et al., 2017; Thoits, 1986; Dean and Davidson, 2018). Next, we address the rationale for suggesting that a social marketing approach may be best suited to promote social support.

2.4.4. Social marketing and social support

The interest of behavioral medicine and health psychology in the concept of social support has fueled the development of many interventions designed to improve social support. However, there is no consensus as to the most effective form of intervention (Hogan et al., 2002). Most of the programmes intended to enhance social support are delivered from a public health perspective, not following a social marketing approach, and yet, social marketing principles and practices seem particularly advisable for social support interventions.

Three main arguments justify the suitability of a social marketing approach in social support interventions. First, we highlight the principle of exchange in social marketing. According to social exchange theory human actions result from subjective cost-benefit analysis and the comparison of alternatives, thus social marketers must provide strong incentives by emphasizing how the benefits of their offerings outweigh the respective costs (Luca and Suggs, 2013). The exchange element of social marketing is considered a core component in social marketing interventions and is one of Andreasen's (2002) benchmarks. Similarly to social marketing, exchange models also provide methods for addressing the interdependency of relationships involved in social support exchanges (Shumaker and Brownell, 1984), social support is basically an exchange of resources between individuals (Gottlieb and Bergen, 2010). Social marketing is thus in a good position to conceptually interpret and explore the interdependent and reciprocal nature of social support.

A second argument can be made based on the consumer-centered perspective of social marketing. An important feature of social marketing rests in its consumer approach, meaning that peoples' needs, values and preferences are evaluated and pondered before a certain behavior change strategy is selected and implemented. This makes social marketing more competitively minded and audience centered than alternative health intervention approaches, whose projects are usually designed based on political as well as expert assessments of risk and solutions, minorizing the importance of consumer insights (French and Apfel, 2014). Central to social marketing process of consumer research is the harnessing of deep, meaningful insight of consumers' behaviors, roles and

networks of influences in order to develop a deep understanding of the social issues under investigation (Brennan et al., 2015). In practice, the evaluation of existing networks of social support is a natural process of social marketing that comes with its consumer centered approach.

Finally, social marketing as a discipline can also benefit from the exploration of the social support concept. Social marketing research has examined how individuals implement behavior change, but there has been less emphasis on how people can cope with the cognitive and emotional aspects of engaging and maintaining change (Logie-Maciver and Piacentini, 2011). The role of social support as a coping resource in stressful situations has long been recognized in social support literature (Kim et al., 2010; Mattson and Hall, 2011). Under conditions of pressure related with behavior change, social support can potentially act as a buffer by lessening the adverse effects of stress (Barrera, 1986; Cohen and Wills, 1985; Thoits, 1986).

Social marketing literature discussing social support is very scarce. Albrecht (1995) suggested that social marketers, when designing messages to promote health services, should consider the reinforcing functions of social support, including the capacity of support to reduce the recipients' uncertainty under stressful conditions and the enhanced sense of personal control. According to Albrecht, parallel to the primary health change promotion messages, developing supportive messages that enhance a sense of caring and support and diffusing key messages to the support systems of the members of target audiences are two important ways by which social support complements the social marketing process. Despite the significance of the arguments put forward by Albrecht, the social marketing discipline misses a sound theoretical framework that could justify and guide the use of social support in health-related social marketing interventions.

Curiously, while social support is under-investigated in social marketing research, in the close field of transformative service research (TSR) the concept of social support has been intensively explored in the study of vulnerable consumers, with interesting results. TSR is an emerging field of service marketing research that is focused on the relationships between services and consumer well-being to relieve or minorize forms of consumer suffering. The term "transformative service research" was first used by Rosenbaum (2006) in a study of the role of third places (places such as diners, coffee shops, and taverns) in providing commercial social support to consumers. In this study, Rosenbaum (2006) explored how third places can serve to satisfy not only consumption needs but also consumer needs for social support, and concluded for a positive relationship between received social support and loyalty to these commercial places.

Rosenbaum et al. (2007) later examined how socially isolated people can remedy their negative symptoms of emotional loneliness by receiving social support resources from third-place relationships or commercial friendships. Under a TSR framework, and studying two online communities for people with Parkinson's Disease and Motor Neuron Disease, Loane et al. (2015) demonstrated that members experience the co-creation of different types of consumer value through the exchange of social support in these consumer-dominated online environments. Similarly, Yao, Zheng and Fan (2015) found that stigmatized patients with high levels of social exclusion (people with hepatitis B) can attain improved quality of life through online social support. More recently and studying an online support group for weight management, Parkinson et al. (2017) showed how vulnerable consumers experience transformative services which are consumer-dominant to overcome their vulnerability, by creating safe third places, such as online support groups, to receive social support and concluded that transformative services have the capacity to optimize their services to enable vulnerable consumers to co-create social support.

Despite the inexistence of a solid theoretical background justifying the operationalization of social support in social marketing, the fact is that some health-related social marketing programmes do apply social support principles to attain their behavioral change objectives (e.g. Hightow-Weidman et al., 2011; Keller et al., 2012 Withall et al., 2012; Mumm et al., 2017). Given that no published review is available elsewhere, the first section of this research offers a scoping review of field social marketing interventions in the health area that apply the social support concept.

Chapter 3 – Methodology

3.1 Introduction

This chapter describes and justifies the methodology choices for the study and how they are influenced by the researcher's epistemology and ontological stances. It details the philosophical stance of the researcher, the research design of the study and research methods. Finally, the chapter concludes with a discussion about the quality of the methodological procedures adopted by commenting on the validity and reliability of the study and the potential for generalization and transferability.

3.2 Ontological and epistemological positioning

This section details the considerations and assumptions regarding the philosophical influences of this study, which result from the philosophical standpoint of the researcher. The philosophical perspective of the researcher describes its way of looking at the world and making sense of it, providing a context, grounding the logic and criteria of the study and helping to underpin the choices and decisions regarding how the research work is to be conducted (Crotty, 1998; Carson et al., 2001). Failure to reflect through such philosophical issues can affect the quality of research as they are central to research problems formulation, research design, methodologies and methods to be used, data interpretation, and consequently research outcomes (Easterby-Smith et al., 2012).

According to Rousseau (2014) different theoretical considerations and perspectives on reality and knowledge, which result from personal epistemology assumptions (ways of inquiring into the nature of the world) and ontology (nature of reality), imply specific concepts about the research work, the structure of reality and the sources of knowledge, resulting in "nich paradigms" that often oppose scientists in the academy. The conflicts between researchers that advocate different philosophical perspectives run deep and are a subject of substantial discussion amongst academics. Furthermore, the philosophical influences may not be self-recognized, since researchers often simply follow the methodological traditions and perspectives passed by those who teach them, or the research traditions imposed by the dominant paradigms (Easterby-Smith et al., 2012).

The route map of influence of research philosophies in the methods and techniques for data collection and analysis was represented by Easterby-Smith et al. (2018) using the metaphor of a tree, were each ring of the tree´s trunk is influenced by the decisions taken at higher levels. Figure 3 illustrates the route map of these relationships, starting with

the broad and abstract philosophical issues and moving to the concrete tools and techniques of the research methodology and research methods.

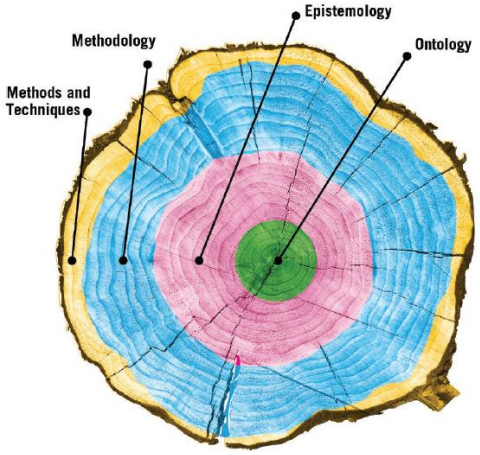

Figure 3 – The philosophy of research
Source: Eastery-Smith et al. (2018, p.62)

As illustrated by Easterby-Smith et al. (2018), the inner ring of the trunk represents ontology, meaning the philosophical assumptions about the nature of reality. The second inner ring represents epistemology, or the assumptions about the best ways of inquiring into the nature of the world. The third ring from the center corresponds to the methodology, meaning the way research techniques and methods are grouped together to provide coherent research design. Finally, the outer fourth ring of the trunk represents the individual research methods and techniques that are used for data collection and analysis. This metaphor implies that the methods for data collection and analysis can be tracked back to a certain research methodology, epistemology, and ontological position.

In their model, Easterby-Smith et al. (2012) identify ontology as the nature of reality and existence, or the philosophical belief stance of the world taken by the researcher, meaning what reality is comprised of. According to the authors, in social science research there are three key ontological stances, realism, relativism and nominalism. Realism emphasizes that the world is concrete and external, and that reality exists independently of the researcher (Rousseau, 2014). In realism researchers believe in a single and objective truth and that facts exist and can be revealed (Cruickshank, 2003). Conversely, relativism assumes that reality is socially constructed, that individuals develop subjective meanings of their own personal experience, giving way to multiple realities (Hugly and Sayward, 1987). In relativism it is recognized that scientific laws are created by people who are embedded in context, thus science depends of the viewpoint of the observer and there is no single truth, but multiple truths (Easterby-Smith et al., 2018). The nominalist

position goes further by suggesting that there is no truth, that facts are all human creations and that the interesting research questions concern how people construct different versions of truth (Easterby-Smith et al., 2018). As noted by Crotty (1998), epistemological and ontological philosophical issues tend to emerge together, and because of their mutual influence, it is difficult to separate them conceptually. Next, we address the main epistemological positions in social sciences and how they relate to ontology.

Epistemology relates to the nature of knowledge, and is concerned with what constitutes acceptable knowledge in a given research context (Carson et al., 2001). Epistemological positions are characterized by a set of assumptions about the specificities of knowledge and the best ways of reaching knowledge, providing answers to the question: "What and how can we know?" (Wiling, 2013). According to Easterby-Smith et al. (2018) there are two main contrasting epistemological perspectives in social sciences: positivism and social constructionism; other philosophical viewpoints tend to fall between these two.

Positivism holds that the social world exists externally, and that its properties can be measured through objective and reliable scientific methods, rather than being inferred subjectively through sensation, reflection or intuition (Crotty, 1998; Carson et al., 2001). Consequently, positivism in human sciences typically establishes the "truth" through the collection and analysis of objective data and supports quantitative methods, hypothesis testing and deductive reasoning (Carson et al., 2001). When applied to social sciences, positivism researchers believe that, as in natural science, social phenomena can be captured by accurate empirical observation and exhibits law-like properties; as such, positivists are concerned with making claims about generalization of results for a population (Lee and Jones, 2015). Within this logic, social data and analysis should be kept value-free without any external influence maintaining an objective distinction between facts and value judgements (Healy and Perry, 2000). Positivism in the social sciences has been criticized by researchers that outline the complex, interactive and dynamic social processes that characterize human social behavior (Avenier and Thomas, 2015). According to Lee and Jones (2015), positivism ignores situated meaning in favor of reporting reductionist results and is not suitable to theory development because it limits findings to low level of abstraction tractable issues.

The social constructionist position is directly opposed to the positivist stance and stems on the notion that reality is social constructed, being determined by people rather than objective and external factors (Easterby-Smith et al., 2018). For constructionists, knowledge is relative, adaptive and active, and the role of the researcher is to unveil the

different constructions and subjective meanings that people attach to their experiences, behavior and surroundings, with no pre-conceived notions of what forms of experiences are to be expected (Easterby-Smith et al., 2018; Lee and Jones, 2015). The social-constructionist perspective assumes that people´s understanding of the "real world" is inseparable from one´s values, beliefs and interpretations (Gergen, 1992). Researchers working from a social constructionist stance embrace the notion that the researcher is part of the study environment, and brings a plethora of prior knowledge, including beliefs that will inevitably influence the way the study is conducted and conclusions are drawn (Rocco et al., 2003). In social constructionism data and knowledge representations tend to be based on detailed accounts of written-spoken word and ideographic symbolic action with a focus on detailed, rich, and thick description written directly and somewhat informally, contrasting with the formal and more passive reporting of positivist research (Lee and Jones, 2015). The social constructionist paradigm also presents some limitations. First, there are some claims of a move towards idealism and dogmatism, since findings often lack concrete evidence (Lee and Jones, 2015). Additionally, data collection within the constructionist paradigm can take up a great amount of time and resources; analysis and interpretations of data may be difficult because they depend on the intimate tacit knowledge of the researcher; and interpretations may lack credibility with external publics, such as decision-makers (Easterby-Smith et al., 2018).

Based on the description provided, the link between ontology, epistemology research methodologies and methods and techniques of data collection and analysis are evident. A realist ontological stance emphasizes the concrete and external nature of the world, epistemologically implying that objective reality can be inquired in search of true answers. In accordance, positivist epistemologies hypothesize about the nature of objective truth and use predominantly quantitative data and research methods to deduct about objective causal relationships. In contrast, relativist ontology recognizes the existence of multiple truths, depending on the viewpoint of the observer, thus it is often associated with constructionist epistemologies and research methods that better ascertain multiple view-points are preferred. For this reason, qualitative research tends to prevail. Kincheloe and Tobin (2009) points out that positivist epistemologies are dominant in social science scholarship. A situation that the authors attribute to the western ethnocentric view of academic research and the step-by-step solutions of "how to do research" presented in some universities. In Marketing academia, the dominant epistemological approach has also been the positivism, with a focus on logical

empiricism, the use of scientific research methods and explaining rather than questioning the marketing system (Gordon and Gurrieri, 2014).

The dualist divide between constructionist incommensurability and positivist rigid assumptions about data hinders the understanding of social support as a complex system of structure and agency through social capital (Lee and Jones, 2015). As a researcher, the author of this thesis situates itself along the lines of new trends that integrate qualitative and quantitative methodologies (Creswell, 2014). As such, the researcher would position itself epistemologically near critical realism which is ontologically connected with the metatheory of transcendental realism (Bhaskar, 1978) and seeks to bridge some long-standing divisions within the social sciences between positivism and constructionism (Al-Amoudi and Willmott, 2010; Sorrell, 2018). Although the explicit adoption of critical realism has been relatively rare amongst marketing scholars, Rees and Gatenby (2014) highlight that the philosophical underpins of realism have been present in a large range of management and organizational research including institutional theory and industrial studies, that acknowledged the importance of both social structures and the meaning that actors and groups attribute to their situation, along with the discourse used to convey such meaning.

The author of the thesis believes that Bhaskar's philosophy of critical realism (Bhaskar, 1978; 1998) offers a more convincing and integrated account of the nature of reality (ontology) and the status of knowledge (epistemology) than do competing philosophies of science. Coherent with transcendental realism, critical realism lays in a "structured ontology", which differentiates between three strata of reality: i) the empirical domain, which comprises the experiences and perceptions that people have of what happens; ii) the actual domain, which comprises the events that do occur in the world, independently of whether or not they are observed or detected; and iii) the real domain, which is considered the deepest level of reality and comprises the generative mechanisms that cannot be detected directly, but that have real consequences for the individual and societies (Bhaskar, 1978). Critical realist approaches span the apparent 'irreconcilable' gap between positivism (realist informed) and social constructionism (relativist informed), since it is based on the view that there is an objective reality – but this reality is mediated by individual perceptions and cognitions (Fleetwood and Ackroyd, 2004).

As explained by Sorrell (2018), from a critical realist perspective, the primary objective of scientific research is not to predict or to interpret but to explain – as in this research, whose main objective is to develop empirically supported explanations on how social capital may influence social support seeking and social support provision behaviors in

OHCs in which members face treatment uncertainty, by researching the generative mechanisms associated to social capital. According to Bhaskar (1978), the initiator and main philosopher of critical realism, the objective of science is to uncover the nature and also the structure of the entities under study, to identify and explain their causal properties with reference to their structure, and to use this understanding to explain particular events in terms of contingent combinations of entities and their associated properties, explaining the deep level of reality.

In critical realism, social structures, unlike natural and physical objects or physiological structures, are understood as mental interpretations carried out by imperfect humans (Lee and Jones, 2015). The social structures have emergent causal properties that derive from the relationships established between participant members and the artefacts of which they are comprised, but which are mediated through individual agency (Elder-Vass, 2010). The resulting structured interactions give the social entity causal powers (e.g. the power of an OHC to enforce norms or obligations or to impose a shared narrative) that affect social agents' actions. Social entities, through social structure, enable, constrain and motivate the actions of participant members (Rees and Gatenby, 2014) and social entities are, in turn, either reproduced or modified by the actions of members (Sorrell, 2018). Critical realism proposes a complex view of the social world in which individuals are neither absolute passive products of social structures nor entirely their creators, but rather are placed in an iterative and naturally reflexive feedback relationship, being influenced and influencing the social structures (Rees and Gatenby, 2014).

In respect to the causal mechanisms in the social world, critical realists do oppose positivist philosophical stances that understand causality as a simple regular succession of empirical events (Bhaskar, 1978). First, these regularities are relatively uncommon within the social world, and second, reliance upon them reduces the researcher's understanding of causality to the level of the empirical, rather than the real (Sorrell, 2018). Causality in critical realism is understood as an inherent property of social entities, deriving from structure, and creating a tendency to reproduce certain outcomes. Positivist identification of empirical regularities (e.g. through regression models) may provide evidence for the operation of particular causal mechanisms in particular circumstances, but fails to explain the mechanisms involved (Bhaskar, 1978). The notion of generative mechanisms is considered by Bhaskar (1978) central to realist ontology. Such generative mechanisms can exist beneath the empirical surface in the real domain and, therefore, are not directly observable. For realists, explanation depends on identifying generative mechanism and how they work, and discovering if they have been

activated and under what conditions (Eastwood et al., 2019). The critical realist process of "retroduction" explains causality through the postulation of these generative mechanisms which can account for, and contextualize, the discourses of the specific social agents being investigated and searches for connections between subjective interpretations, actual events and deeper causal explanations (Rees and Gatenby, 2014).

Critical realism has no preference for a particular research method; choice depends upon the research questions and the nature of the relevant entities and causal mechanisms under research, with mixed methods approach being encouraged (Sorrell, 2018). This pluralistic epistemology promotes the mixing of quantitative and qualitative data as a movement toward a more total explanation of events (Lee and Jones, 2015).

SNA is especially well-suited for the analysis of social structures informed by a critical realist perspective because it enables a quantified visualization of social structures and allows the analysis of how individual and collective agency is embedded in and at the same time constrains social structure, thus capturing the interplay of agency and structure, that forms an essential epistemological argument of critical realism (Pryke, 2012). However, to leave the analysis at this level, would be insufficient from a critical realist perspective, as it merely examines the 'domain of the actual' and, as such, cannot establish the hidden dynamics of the multi-relational stratified nature of shared discourses (Rees and Gatenby, 2014). Qualitative research methods involving case studies and ethnography are considered an appropriate approach to uncover such complex and contingent mix of entities and mechanisms that together explain particular events in the social world (Avenier and Thomas, 2015; Sorrell, 2018). According to Rees and Gatenby (2014), ethnography informed by a critical realist perspective, provides a well-established way of clarifying relationships in social structures, based upon the observation of behavior, to reveal emergent patterns of interaction and generative mechanisms at the societal level. SNA and ethnographic enquiry, when combined within a realist framework, thus serve to explore the effects of structure and social capital generative mechanisms in social support interactions.

Our research approach is consistent with the core tenets of critical realism, synthesized by Rees and Gatenby (2014): i) First, it holds to a stratified emergent ontology, in which the empirical domain, comprising the experiences and perceptions of OHCs members is qualitatively analyzed through netnography (an adaptation of ethnography studies to the online environment) and the actual domain, consisting in enacted social support (social support that exists independently of OHC member's perceptions) is analyzed through quantitative SNA; ii) The dualist approach allows us to inquire into the deepest level of

reality and to focus on the structures and generative mechanisms as objects of inquiry; iii) Recognizes that social events (social support interactions) are the outcome of multiple causal mechanisms and recurs to a specific framework of analysis, the theory of social capital, to explore such diverse mechanisms.

In conclusion, critical realism offers a suitable meta-theoretical paradigm for exploring the underlying generative mechanisms that shape social support interaction in OHCs in which the pluralistic epistemology, that permits the merging of quantitative and qualitative analytical techniques, allows us to better capture the effects of structure and social capital in social support, without following in the incongruences and contradictions of using distinct research paradigms. Having explained how critical realism offers a robust philosophical underpinning to our research, the next section details the research methodology adopted for this thesis.

3.3 Research methodology and methods

The nature of the research questions that guided this study, the specific domain of research and the lack of conceptual and theoretical literature exploring social support from a social marketing perspective, required a research approach that, being suitable to study the online environment, could start with exploration and progressed towards explanation. Given its natural fit, a mixed-methods research design based on a preliminary scoping review, followed by a dual case-study, that combines qualitative and quantitative research methods, was used to explore participants' social support interactions in OHCs where users face treatment uncertainty.

First, a scoping review of social marketing interventions in the health area was developed to map the diversity of practical approaches to the social support concept in social marketing and to gain an understanding of which theories or models are being used to sustain the use of the concept in field interventions. This scoping review served as a valuable background for the next phases of the research work, which involved the analysis of social support interactions in two specific OHCs where users are subject to treatment uncertainty, with the objective of accessing the nature of such relationships and frame possible social marketing interventions intended to promote social support and enhance the quality of support available in these online environments.

To study social support interactions in the two OHCs case-studied, the research used a mixed-methods approach, involving a combination of qualitative analysis, based on netnography, with a quantitative study that applies SNA. A methodological approach

that could deal with Nahapiet and Ghoshal's three dimensions of social capital was instrumental for achieving the aim of this research. Consequently, netnography was applied to investigate participant behavior and understand how the various dimensions of social capital (structural, cognitive and relational) influence support relationships within the OHCs. The qualitative phase of the study also served to extract and define user interaction patterns of social support exchange that served as the basis for the quantitative stage of the research. The quantitative study recurred to SNA to analyze the network structure of social support in the OHC's under study.

Besides epistemological reasons, which were alluded in the previous chapter, there are also practical arguments for combining quantitative and qualitative approaches in this research. The practical strand of the argument is based on the principle that research questions impose methods (Edwards, 2010), in particular, research questions about the structure of the networks are better answered through quantitative methods, whereas research questions about the cognitive and relational processes that affect social support interactions, require an analysis of content, and are thus better served by qualitative methods. According to Teixeira (2014) there is scope to fruitfully combine netnography, an adaptation of ethnographic research to the online environment, with SNA, a mathematical method that builds on the principles of graph theory to study the relations between actors, and how they influence the underlying network of relationships (Stewart and Abidi, 2012). Both research methods, netnography and SNA, are naturalistic and well suited to research the online environment and sensitive topics that involve personal health information. They complement each other in the sense that while netnography provides a rich textured cultural understanding on the online communities and human behavior of cultures and communities present on the internet, SNA offers a method to investigate the underlying structure of online interactions (Kozinets, 2010).

Currently there is a great interest in mixed-methods studies that combine the use of network analysis with qualitative methods of sociological research, such as ethnographic methods (Jones, 2018). Thus, this research makes a contribution from the methodological point of view by blending the qualitative approach of netnography, an established method for the study of online communities in marketing (Kozinets, 2002), with the structural perspective provided by SNA, a re-emergent quantitative method that is getting widely established across disciplines such physics, mathematics, computer science, medicine, sociology and anthropology (Teixeira, 2014).

This study applies one Creswell's (2014) advanced methods for mixed methods research, named *transformative mixed method*. The transformative method is usually guided by

a theoretical model or framework that reflects the purpose of the study and research questions: for this study we apply Nahapiet and Ghoshal's (1998) framework of social capital to analyze social support interactions in the OHCs. The data in a transformative mixed method can be collected concurrently (concurrent transformative strategy) or sequentially (sequential transformative strategy) or through a combination of both, depending on the nature of the study and the research questions. In this case, the data for the netnographic and the network analysis sections of the study was collected concurrently, and the analysis and interpretation of the data took a side-by-side and complementary approach (Creswell, 2014). Although the research design can be classified as compensatory (Easterby-Smith, Thorpe and Jackson, 2012), since it involves both qualitative and quantitative research methods, where each is used to explore different dimensions of the object of study, the research is eminently qualitative since the network analysis performed is also based on relational data extracted during the netnographic study. We collected and analyzed data via qualitative methods and used SNA to formalize the structure of social support interactions drawing from Nahapiet and Ghoshal's (1998) notion of structural social capital.

Considering the specificity of each method used, and the organization of this thesis in essays, we opted to clarify the concrete procedures for data collection and analysis of each component of this research in chapters 4, 5 and 6. In the next sub-sections the main research methods used in the study, scoping review, netnography and SNA, are introduced.

3.3.1. Scoping reviews

Scoping reviews are a relatively new form of knowledge synthesis method that can be used in alternative to systematic reviews to clarify or map the use of key concepts (Peters et al., 2018; Tricco et al., 2018). Colquhoun et al. (2014) define scoping review as "a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge" (pp. 1293-1294).

As explained by Tricco et al. (2016), scoping reviews differ from systematic literature reviews in the sense that while scoping reviews are exploratory in nature, being commonly used to examine areas that are emerging, to present a broad overview of studies results without a concern for studies' quality assessment or to explore the use of academic concepts, systematic literature reviews, on the other side, are suitable to

address more specific questions, based on particular criteria of interest, defined a priori. As exemplified by the authors, systematic reviews in healthcare are useful for answering specific and clearly defined research questions such as "does this intervention improve specified outcomes when compared with a given comparator in this population?", whereas scoping studies are useful for answering more exploratory research questions, for example "what is known about this concept?". For Peters et al. (2018) if the review is intended to evaluate the feasibility, appropriateness, meaningfulness or effectiveness of a certain treatment or practice, then a systematic review is the most valid approach; if the research is focused in the identification of certain characteristics/concepts in papers or studies, and in the mapping, reporting or discussion of these characteristics/concepts, then a scoping review is the better option. Table 7 compares the indications for scoping and systematic reviews based on Peters et al. (2018).

Table 7 - Indications for systematic reviews and scoping reviews

Systematic Review	Scoping Review
Uncover the evidence	To identify the types of available evidence in a given field
Confirm current practice/address any variation/identify new practices	To clarify key concepts/definitions in the literature or identify key characteristics or factors related to a concept
Identify and inform areas for future research	To examine how research is conducted on a certain topic or field
Identify and investigate conflicting results	As a precursor to a systematic review
Produce statements to guide decision-making	To identify and analyze knowledge gaps

Adadpted from Peters et al. (2018)

Considering the differences in objectives of systematic reviews and scoping reviews explained by Tricco et al. (2016) and Peters et al. (2018), and based on a preliminary search for academic articles, which revealed a paucity of social marketing interventions operationalizing the concept, as well as the lack of theoretical literature discussing social support from a social marketing perspective, we opted to conduct a scoping review in the present study, instead of a systematic review, to evaluate how the social support concept is being operationalized in social marketing interventions in the health area. Scoping reviews of practice-based interventions have been used previously to investigate health topics, when theoretical literature is scarce or inexistent or practical frameworks for implementation of specific concepts, notions or ideas are not available (Reeves et al., 2011; Aarts et al., 2012; Allen-Scott et al., 2014; Zisman-Ilani, Barnett, Harik, Pavlo and O'Connell, 2017; Jongen, McCalman and Bainbridge, 2018).

3.3.2. Netnography

Ethnography is among the most well-established approaches that can be found within qualitative inquiry in social sciences. Its roots can be traced back to nineteenth-century Western anthropology studies of small rural societies, where ethnography was understood as a descriptive account of a community or culture (Reeves et al., 2013) and was mostly seen as a complement to ethnology, which refers to the historical and comparative analysis of non-Western societies and cultures (Savage, 2000; Hammersley and Atkinson, 2007). The ethnographic approached was later adopted in the 1940's by the Chicago School of Sociology (Hammersley and Atkinson, 2007; Reeves et al., 2013) and applied to a variety of research work in urban settings in their studies of social life and urban ecology (e.g. Wright, 1940; Whyte, 1943; Drake and Cayton, 1945; Suttles, 1968).

Some authors argue that ethnography does not have a standard, well-defined meaning, being often confused with other labels such as qualitative research, participation observation, qualitative inquiry or fieldwork (Savage, 2000; Hammersley and Atkinson, 2007). The term can also be applied to a philosophical paradigm, to a methodology, method or process and also to the written account of a particular ethnographic project, meaning the product of a research work (Savage, 2000). Bronislaw Malinowski is commonly regarded as the first author to systematize ethnographic methodology (Hammersley and Atkinson, 2007; Gobo and Molle, 2017). In his book *Argonauts of the Western Pacific: An Account of Native Enterprise and Adventure in the Archipelagoes of Melanesian New Guinea*, Malinowski (1922) describes the main objectives of ethnographic field-work, as follows: i) to grasp the organization of the community and the anatomy of its culture; ii) to assert the imponderabilia of actual life and individuals' behavior; and iii) to collect statements, characteristic narratives, typical utterances, items of folk-lore as documents of native mentality.

According to Reeves et al. (2013) ethnography generally refers to forms of social research having the following key characteristics: i) emphasis on the exploration of social phenomenon, instead of setting out hypotheses about it; ii) the focus is usually on a few cases, generally fairly small-scale, such as a single setting or group of people, to facilitate in-depth study; iii) data collection is, for the most part, relatively unstructured, meaning that it does not involve following through a fixed and detailed coded scheme, with coding categories being generated out of the process of data analysis; iv) analysis of data privileges the interpretation of meanings and human behavior in everyday contexts, in the field, rather than under conditions created by the researcher; and v) the product of

ethnography usually takes the form of verbal descriptions and explanations. Reeves et al. (2013 p. 512) further asserts that the central aim of ethnography is "to provide rich, holistic insights into peoples' culture, views and actions, as well as the nature of the location they inhabit, through observation and the collection of testimonies, to understand the way the group sees the world".

An ethnographic approach was considered a suitable qualitative research method to the present study because it allow us to describe and interpret the patterns of social support interaction, the quality and richness of online social support interactions, and the unified systems of meaning in the OHCs under study, which constitute the basic pillars of the structural, relational and cognitive dimensions of social capital (Nahapiet and Ghoshal, 1998). Moreover, new developments in ethnographic inquiry have resulted in specific methods adapted to the online environment. Online ethnography extends traditional ethnographic study from field observation and face-to-face researcher-participant interaction to the virtual field of the internet (Reeves et al., 2013). Online ethnography refers to several online research methods that adapt ethnography procedures to the study of communities and cultures created through computer-mediated social interaction (Cova and Antone, 2016). Among these methods, netnography is the most prominent since it presents a specific set of procedural guidelines to conduct an ethnography of an online community (Caliandro, 2014).

Netnography was developed by Kozinets and first applied by the author in a study of X-Philes culture, meaning online groups of fans of the X-Files television show that aired in the 1990s (Kozinets, 1997). Kozinets (2002) defines netnography as a "written account resulting from fieldwork studying the cultures and communities that emerge from on-line, computer mediated, or internet-based communications, where both the field work and the textual account are methodologically informed by the traditions and techniques of cultural anthropology" (p. 62). The netnographic method is inherently flexible, naturally exploratory, less expensive and less time-consuming than traditional ethnography enquiry, allowing researchers to study cultures and communities that emerge through computer-mediated communications (Kozinets, 2002). Given the sensitive nature on the topic under research, which involves health information, the online environment where social support interactions occur, and the naturalistic attributes of netnography (Heinonen and Medberg, 2018), a netnographic approach was considered particularly appropriate for this research. Netnography allows to extract the voice of a specific community, when face-to-face field research methods are not suitable for reasons of cost, time and geographical constraints (Sadovykh et al., 2015) and is

suitable to study online communities supporting marginalized, at risk, and anonymity-seeking people or those with specific health concerns and interests (Costello et al., 2017).

Netnography is a useful research method for marketing as it involves a deep exploration of complex social interactions by analyzing people's online discourses and practices as related to marketing-oriented issues using online spaces as field-work sites (Brennan et al., 2015). Heinonen and Medberg's (2018) systematic review revealed that netnography has been applied in a variety of topics across different marketing research fields, including consumption and brand communities, consumption experiences, brand management, co-creation, product development, open innovation, consumer identity, authenticity, anti-consumption, destination branding and online word-of-mouth, among others.

3.3.3. Social network analysis

Despite its current popularity, SNA has its roots in the 1930`s. The psychiatrist Jacob Levy Moreno is considered the pioneer of SNA (Marsden and Lin, 1982; Hummon and Carley, 1993; Freeman, 2004). Moreno systematically studied ties linking social actors and used illustrations of networks to represent social interactions, denominating these as sociograms, when studying relationships between inmates of a prison (Moreno et al., 1932) and when reserarching residents in a reform school for girls (Moreno, 1934).

SNA is not a formal theory, but rather an approach for researching social structures that makes use of a set of tools and techniques to analyze how the topological (or structural) properties of networks, and the positions of individual actors within the network, influence its overall dynamics (M. Zhang, 2010). According to Scott (2007), network analysis has its origin in three main research areas:

i) Sociometric analysis and graph theory, including Moreno´s sociometric perspective, which applied quantitative methods to inquire into the evolution and organization of groups and the position of individuals within them and whose main innovation was the introduction of the sociogram (Moreno et al., 1932; Moreno, 1934), and Lewin's (and colleagues) research on the structural properties of networks, based on mathematical models of topology and the application of graph theory (e. g. Lewin, 1936; Lewin and Lippitt, 1938; Lewin et al., 1939);
ii) The Harvard perspective, which is represented by authors such as Warner, Lunt, Mayo and Homans, who pioneered the use of inter-relational models and cliques,

and developed algebraic models of groups and matrix models of network analysis (e.g. Mayo, 1933; Warner and Lunt, 1941; Homans, 1950);

iii) The social anthropologist perspective, with academics such John Barnes and Clyde Mitchell from the Department of Social Anthropology in Manchester University and Elizabeth Bott working at the London School of Economics and Political Science. These authors focused on the analysis of structural relations and reinterpreted concepts from graph theory, such as network density, cliques and clusters, under an anthropological, sociological and psycho-analytical perspectives, to identify social groups in social networks, while also providing a qualitative approach to collect data amenable to SNA, and demonstrated the potential of mixing network analysis with qualitative methods in sociological research (e.g. Barnes, 1954; Bott, 1955; Barnes, 1969; Mitchell, 1969).

Freeman (2004) identifies a fourth important research stream in the development of SNA, that begun in the late 1990's, when physicians Duncan Watts, Stevan Strogatz, Albert-Lásló Barabási and Réka Albert began publishing on SNA. According to Freeman there was a "revolutionary change" when Watts and Strogatz (1998) addressed the concept of *small worlds* in relation to the patterns of acquaintanceship linking pairs of persons. The authors speculated that any two stranger persons in the USA are linked by a chain of acquaintanceships involving no more than six intermediaries, originating the famous expression that gained popular interest "six degrees of separation". Watts and Strogatz (1998) later concluded that some biological, technological and social networks can be highly clustered and yet have small characteristic path lengths behaving like small-world networks. Another influential research in SNA was Barabasi and Albert's (1999) examination of the degree distribution on large scale networks (world wide web, screen actors who worked together on films and links between generators, transformers and substations in the USA electrical power grid) and their conclusion that these distributions were extremely skewed, following a power law distribution.

By the end of the 1990s, the methods and possibilities of network analysis were well established and formalized (Baggio et al., 2010; Albrecht, 2013). Currently, the trending form of SNA consists in a series of mathematical techniques that analyze the patterns of connections, or ties, among actors in the network (Leonard et al., 2015). In 2004, Freeman characterized SNA as an organized paradigm for research characterized by four basilar features: i) it involves the structural notion that links connect social actors; ii) it is grounded on the systematic collection and analysis of data pertaining to social relations; iii) it draws on graphic imagery to reveal and display the patterning of those

links; and iv) it relies on mathematical/computational models to describe the patterns of social relations.

Despite the obvious importance of social relationships to health outcomes, medical research is usually more focused on individuals and their personal attributes, rather than in relationships and group dynamics. SNA, by contrast, is grounded on a relational, rather than an individualistic approach (Isba et al, 2017). Instead of focusing on the study of individual actors, the SNA approach considers the unit of analysis to be the connections between actors and not the actors themselves (Stewart and Abidi, 2012; Gruzd and Haythornthwaite, 2013). SNA concepts and tools have shown value in some areas of public health and health behavior research, including the spread of infectious diseases, peer-to-peer processes of influence on health behaviors, the diffusion of health care innovations and treatments (Isba et al., 2017).

In the marketing discipline, consumers' social networking interactions related to product experiences and use and product development are important areas of research (Antoniadis et al., 2014), consequently, network theories have been applied to a wide range of marketing issues, including viral marketing and word-of-mouth, relationship marketing, tourism marketing, information acquisition, leadership influence, diffusion and adoption of new products and services (Mattsson, 1997; Achrol and Kotler, 1999; Webster and Morrison, 2004; Antoniadis et al., 2014; Yanga et al., 2010; Möller, 2013). However, until the turn of the last century, few marketing studies applied quantitative SNA techniques. Webster and Morrison (2004) suggested that the general avoidance of SNA within marketing academia was related with the intense data requirements needed to perform SNA and difficulties in mastering the network analytic models and the cumbersome software that was first made available. As a result of the importance that social media and social network sites achieved since the beginning of the century, SNA has gained some popularity among researchers, a phenomenon that can also be observed in the marketing discipline (Antoniadis and Charmantzi, 2016).

To analyze the structure of social support interactions in the two OHC's under study we extracted and analyzed the network of social support interactions leveraging SNA. We opted for SNA because, being suitable for analyzing large amounts of data effectively (Rehm et al., 2018), it provides a widely accepted approach across social sciences to analyze relationship structures (Kimmerle et al., 2013; Teixeira, 2014). Moreover, SNA has been widely used to assess structural social capital (Rehm et al., 2018) and is therefore well-suited for researching the structure of social support interactions in OHCs.

3.4. Quality of the methodological procedures

Research quality is based on principles such as reliability, validity, and generalization, which are essential in research work that intends to be recognized as being rigorous. However, these mean different things within the various research traditions (Easterby-Smith et al., 2012).

Reliability is concerned with the degree of consistency of research findings (Saunders et al., 2009). As explained by Avenier and Thomas (2015) in critical realism, and similarly to pragmatic constructivism and interpretivism, the principle of reliability mainly concerns the cognitive path that leads from the empirical material to the research results; researchers have to provide readers with the means to follow the entire cognitive path. More specifically, researchers have to be transparent on how they have controlled and checked their interpretations throughout the research process. These principles were followed in this study, by making clear the research procedures for data extraction and analysis, including the specificities of the coding procedures, the different levels of participation of the researcher in the process and how inferences were drawn. Thus, it is our conviction that other researchers following a similar research path would reach proximate conclusions.

From a critical realist perspective, validity is not a property of the data, but a logical assessment of the relationships between data and events; thus, making a statement about validity in critical realism involves assembling a chain of arguments about the quality of information the measurement gives about events (Smith and Johnston, 2014). We believe that measurement validity was achieved in the quantitative study by adopting a set of appropriate and well-established measures of network analysis and social capital, that allowed us to offer a clustering model of OHCs' users that was accessed for internal validity based on the methodology suggested in Norusis (2008), and can be interpreted in light of extant theory (external validity). In relation to the validity of netnographic studies, McMillan and Schumacher (1997) highlight the value of researchers' immersion in the context under study to enhance the validity of qualitative research. This was achieved through our prolonged and intense engagement in the OHCs under study, during the cultural entrée and the passive and the active phases of the netnographic study, and through the tasks of manual content and thematic analysis (instead of automated alternatives) providing a great level of familiarity with the OHCs under study. Other specific procedures suggested by Kozinets (2010), and followed in the current study, included a discerning selection of the OHCs case studied, triangulation of cases (dual case study) and triangulation of data sources (archival data of forum messages and

participant-observation techniques involving direct interaction with OHCs members), member checking and thick descriptions.

Research based on case studies is seen as suffering weaknesses when it comes to justifying the potential for generalization (Avenier and Thomas, 2015). In fact, case studies do not allow for positivist generalization from the characteristics of a sample to those of the population. However, the specific meaning of generalization, and hence the way it is justified and evaluated depends on the researcher's epistemological framework (Avenier and Thomas, 2015). In critical realism case study methodologies are a suitable approach to uncover the interaction of structure, events, actions, and context, in order to identify and formalize causal mechanisms (Wynn and Williams, 2012). Adopting critical realism requires the collection and in-depth analysis of qualitative data that reveals contextual factors and mechanisms that would otherwise be undetectable. Therefore, a different form of generalization is sought, rather than statistical generalizability; the aim is to identify findings which are logically generalizable, rather than probabilistically (Popay and Williams, 1998). According to Rees and Gatenby (2014), in critical realism once a generative mechanism or process is identified, generalization from case studies is possible if the specific mechanism is recognized as capable of being operative in other similar situations. As explained by Avenier and Thomas (2015), in critical realism generalization concerns the degree of abstraction of the explanatory model elaborated and generality is not seen as a feature of the empirical domain but as a property of the necessary relations in structures operating in the real domain, resulting from the uncovering of the underlying essence of things, or a movement "from surface to depth". Thus, Avenier and Thomas (2015) conclude that case studies are generalizable insofar as they provide an explanation of the causal relations which are at play.

In respect to the scoping reviews, similarly to systematic reviews, they also require rigorous and transparent methods in their conduct to ensure that the results are trustworthy (Peters et al., 2018). Our scoping review follows the methodology outlined in the "Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) from Tricco et al. (2018), and to further clarify and make the procedures transparent to interested publics, the research project and respective protocol were made public and registered in the Open Science Framework network under DOI: 10.17605/OSF.IO/GFPQW.

Chapter 4 – Uncovering the use of the social support concept in social marketing interventions for health

4.1. Introduction

Social marketing aims to develop holistic solutions that are adequate to induce behavioral change (Carins and Rundle-Thiele, 2014; May and Previte, 2016). The means and tools used in social marketing interventions must therefore make the recommended behaviors appealing, the messages persuasive, easy for citizens to adopt and the environments supportive (Andreasen; 2002; Stead et al., 2007; Carins and Rundle-Thiele, 2014).

Outside the sphere of social marketing, a tool or mechanism that has been extensively used in public health interventions consists of promoting social support. In general, social support can be understood as a transactional communicative process, that includes verbal and non-verbal communication, and that originates from personal relationships (Gottlieb, 2000). Social support is said to improve feelings of coping, esteem and belonging, to reduce uncertainty about the situation, the self, the other, or the relationship, and to enhance a perception of personal control in one's life experience (Albrecht and Adelman; 1987; Gottlieb 2000; Mattson and Hall, 2011). Some of the well documented health outcomes of receiving social support include psychological adjustment, improved adherence and increased efficacy of medical treatments, better coping with illness uncertainty, reduced stress and depressive symptoms, increased resistance and recovery to disease, mitigation of the risks of suicide and reduced mortality (Cassel, 1976; Cobb, 1976; Barrera, 1986; Thoits, 1986; Heitzmann and Kaplan, 1988; Mattson and Hall, 2011; Nolan et al., 2017; Li et al., 2019; Spence et al., 2019).

The overwhelming evidence about the positive impact of social support on individuals' physical, emotional, and social well-being (Pan et al., 2018) has fueled the development of many health related interventions designed to improve social support (Uchino, 2009). However, and as noted by Hogan et al. (2002) in his review of the efficacy of social support interventions, there is no consensus as to the most effective form of intervention. The question is then how the social support concept can be operationalized in social

marketing. This link has not been theoretically established in the literature. Except for a 1995 one-page article produced by Albrecht (in which the author briefly discusses how social support can help social marketers better adapt to audience needs), the role of social support in social marketing remains very much unexplored in marketing theory. Given that no published review is available elsewhere, the primary aim of this chapter is to provide an account of how the social support concept is being operationalized or implemented in social marketing interventions in the health area, through a systematic review of field interventions[1]. Linked with the objectives of the study, this research was guided by the following research questions:

RQ1: How have practitioners operationalized the use of the social support concept in health-related social marketing interventions?

To answer this question, this review evaluated how the social support concept was operationalized in social marketing interventions in relation to each of the social marketing benchmarks defined by Andreasen´s (2002): behavioral change, consumer research, segmentation and targeting, marketing mix, exchange and competition.

RQ2: What is the theoretical support for using the concept of social support in health-related social marketing interventions?

Research on the role of theory in health social marketing interventions suggests that it provides a valuable background to design interventions and that effective interventions tend be theory driven (Luca and Suggs, 2013). This review also aimed to understand which theories or models were used in the reviewed interventions to justify the operationalization of the social support concept.

The remainder of this chapter is organized as follows. The next section outlines the methodology used to conduct the scoping review. The following section presents the results of the literature search, and the third section discusses these results. The final section presents the general conclusions of the review.

[1] This chapter originated an academic article published in the Journal of Nonprofit and Public Sector Marketing

4.2. Methodology

To attain the objectives of the present study, a scoping review was conducted to identify how social marketing interventions have operationalized the social support concept and the respective theoretical support. Scoping reviews are a relatively new form of knowledge synthesis method that can be used to clarify or map the use of key concepts, and identify gaps in research related to a defined area or field (Colquhoun et al., 2014; Peters et al., 2018). Scoping reviews can be used to present a broad overview of a certain topic, irrespective of study quality, and are suitable to explore emerging areas of study, to clarify concepts and to identify research gaps (Tricco et al., 2016). The reporting of the present scoping review followed the procedures outlined in the PRISMA-ScR from Tricco et al. (2018), which can be observed in Appendix 1. The research project and respective protocol can be accessed in the Open Science Framework (OSF) network, under DOI: 10.17605/OSF.IO/GFPQW.

The PsycINFO, PubMed, ISI Web of Science and Scopus databases were searched for full-text peer-reviewed individual intervention studies, meta-analysis and review studies from inception until September 25, 2018. Non-English articles, grey literature, book chapters, dissertations, empirical non-intervention studies, interviews, theoretical articles and conference abstracts were excluded from this review. The database search used the term “social support” in the title, abstract and key terms of the documents, combined with the following terms: health and marketing and intervention or programme* or campaign. Mendeley software was used to store the records originally retrieved from the databases and to remove duplicates.

During the screening process it was found that several articles labelled “social marketing” did not comply with the most basic principles of social marketing, including a customer orientation and the use of other elements of the marketing mix besides promotion. In addition, it was also discovered that some social marketing interventions did not label their approaches as “social marketing”. For these reasons, it was decided to examine the larger set of results against Andreasen's (2002) social marketing benchmarks criteria (Table 5, in section 2.4.2.). This framework has previously been used to assess social marketing health interventions (e.g. McDermott et al., 2005; Stead et al., 2007; Carins and Rundle-Thiele, 2014; Kubacki et al., 2015; Dietrich et al., 2016; Kubacki et al., 2017) and was considered to be suitable for the current review.

All articles were screened for relevance by the author of the thesis. At both screening stages (first level focused on titles and abstracts, and second level on full texts), 10% of

the abstracts were independently screened by two field experts, each of which screened 5% of the articles, and inter-rater reliability, based on simple percentage agreement (number of agreements among authors divided by the number of decisions), was assessed. A high level of agreement was observed in both stages of the screening process (>90%). Differences of view about inclusion criteria were resolved through discussion.

Content analysis, a research method commonly used to make replicable and valid inferences from texts to the context of their use (Krippendorff, 2013), was used to identify and code information concerning the operationalization of social support, in connection with the six social marketing benchmark framework (Andreasen, 2002). Other relevant criteria applied in the codification process included Cutrona and Suhr's (1992) main typologies of social support. We applied the classic five-category system for coding social support: emotional support involves expressions of physical affection, empathy, and encouragement, whereas informational support is characterized by support that provides facts, guidance, or advice. Esteem support involves compliments and expressions of agreement with a support seekers' perspective, and network support includes attempts to expand a support seekers' connections or reinforces existing connections. Tangible support involves offers of physical or monetary assistance. Because this article was focused on providing a broad overview of support content, we opted for not using Cutrona and Suhr's (1992) second level subcategories of support, an option that has also been followed in several studies (e.g. Coulson, 2005; Shoham and Heber, 2012; Hether et al. 2016).

Concerning the second research question that guided this thesis, theory was broadly defined based on Davis et al. (2015, p.5) as "a set of concepts and/or statements with specification of how phenomena relate to each other, that provides an organizing description of a system that accounts for what is known, and explains and predicts phenomena." Theories supporting the social marketing interventions were identified when they were considered by the authors as predicting human behavior or being part of the process leading to a desired behavioral outcome.

The author of the thesis independently charted the data and coded the selected final sample of articles reporting on 19 distinct social marketing interventions. To increase the reliability of the study, the two field experts coded a random sample of articles related with 3 interventions. The inter-rater agreement was high, reaching a Cohen's kappa coefficient of $\kappa = 0{,}96$, meaning substantial agreement (Cohen, 1960; Mchugh, 2012). Discrepancies in codification were solved mainly by revisiting the coding scheme and discussion among the author of the thesis and the two field experts.

4.3. Results

The initial search for literature yielded 1,788 records, including 54 literature reviews and 16 meta-analysis covering a wide range of health areas. From the references list of these reviews, relevant articles were manually searched, and an additional 32 articles were generated and retrieved. After removing duplicates, 1.030 full-text articles were reviewed for inclusion. Following the application of the strict inclusion criteria described in the methodology section, a final selection that included 32 articles that report on 19 individual interventions was reached. In some cases, several articles examined the same intervention at different stages, for example, a first article focused on intervention planning, feasibility, and piloting and sequent articles reporting on intervention results. The review process is summarized in Figure 4, and Appendix 2 provides a detailed summary of the selected interventions.

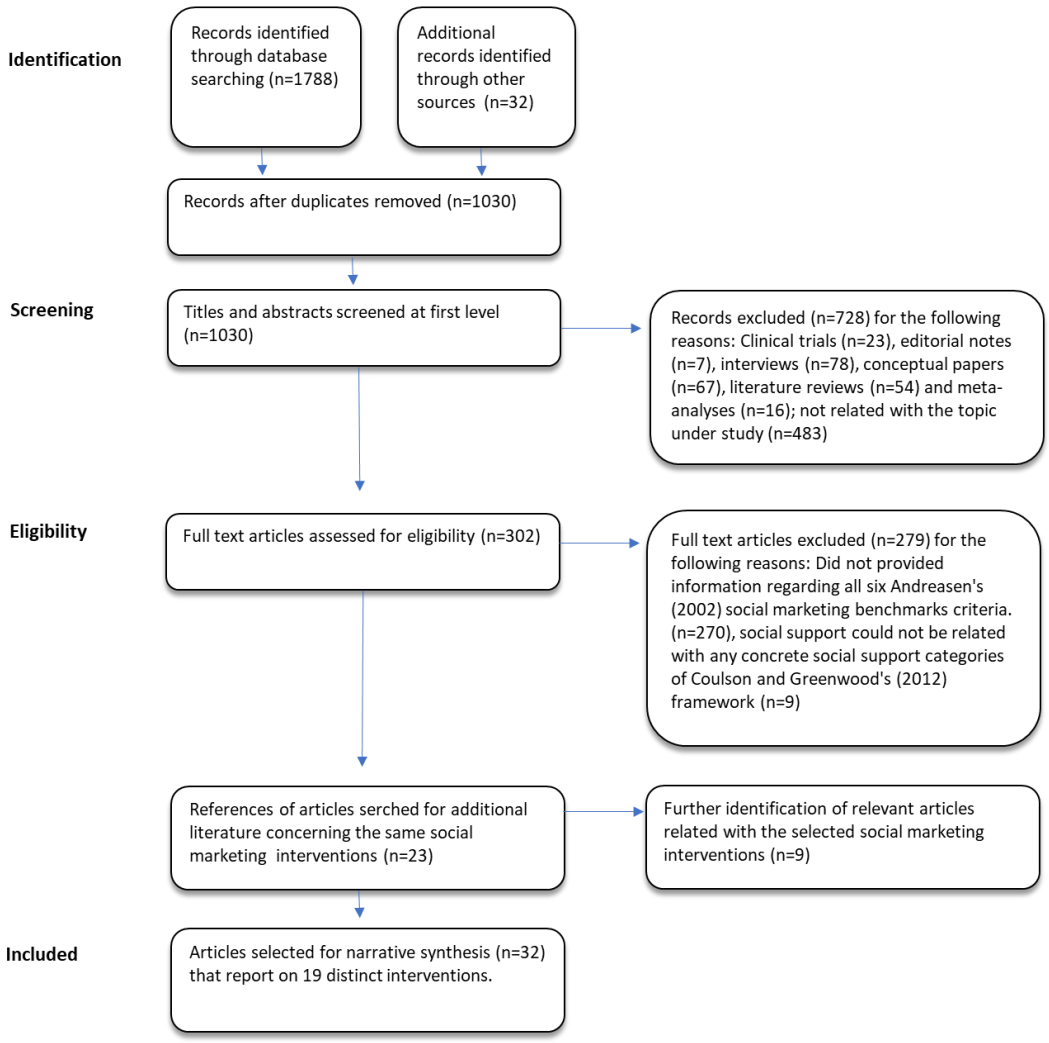

Figure 4– PRISMA flowchart

Source: Own elaboration

The selected articles involved a wide range of different types of interventions, and they were heterogeneous in their targets, objectives, theoretical backgrounds, methods and designs. The interventions also reflected different understandings and forms of operationalization of the social support concept. Table 8 lists the main characteristics of the reviewed interventions.

Table 8 - Summary of the main characteristics of the reviewed interventions

Characteristics of the Interventions	Frequency	Percentages
Location		
United States	16	84.2
Finland	1	5.3
United Kingdom	1	5.3
Australia	1	5.3
Type of intervention		
School-based programme	8	42.1
Community intervention	6	31.6
Outreach intervention	4	21.1
Workplace intervention	1	5.3
Focus		
Downstream audiences	6	31.6
Mixed downstream and middle/upstream audiences	13	68.4
Objectives of the interventions		
Reduce smoking, drugs and alcohol consumption	5	26.3
Promote physical activity	5	26.3
Prevent cardiovascular diseases	2	10.5
Prevent obesity	1	5.3
Prevent diabetes	2	10.5
HIV testing	2	10.5
Syphilis testing	1	5.3
Promote breakfast eating	1	5.3
Design		
Randomized control trial	8	42.1
Other research designs	11	57.9

Source: Own elaboration

As detailed in Appendix 2, all interventions occurred in high-income countries: 84% (n=16) were implemented in the United States, 5% (n=1) were developed in Finland, 5% (n=1) in the United Kingdom and 5% (n=1) in Australia. In relation to the objectives of the interventions, 26% (n=5) targeted smoking, drug use or alcohol consumption, 26% (n=5) promoted physical activity, 11% (n=2) focused on reducing behavioral risk factors associated with cardiovascular diseases, 11% (n=2) aimed to reduce the behavioral risk factors for diabetes, 11% (n=2) targeted HIV testing, 5% (n=1) were obesity prevention

programmes, 5% (n=1) promoted syphilis testing, and 5% (n=1) aimed to stimulate eating breakfast.

Consistent with more traditional definitions of social marketing (Carins and Rundle-Thiele, 2014), the reviewed interventions primarily focused on influencing individual behaviors. However, a significant number of interventions (47%; n=9) also approached midstream or upstream audiences, by acting upon the social or environmental determinants of behavioral change. For example, the Girls Health Enrichment Multi-Site Studies (GEMS) intervention, which targeted African American girls aged 8-10, included a family component consisting in a series of midstream actions to influence families members in creating an environment that favored physical exercise and healthy eating (Baranowski et al., 2003; Story et al., 2003). In another example, the North Karelia Project aimed to reduce cardiovascular risk behaviors of pre-adolescents, by focusing on a broad range of influencing actors, including professionals in the mass media, in health and other services, business leaders, key members of voluntary organizations, and local political decision makers, such as provincial and municipal leaders (Puska et al., 1981; Vartiainen et al., 1983; Vartiainen et al., 1998).

As set out in Table 8 (detailed information is provided in Appendix 2), only 42% (n=8) of the studies used randomized controlled trials. This finding reflects traditional difficulties in obtaining random samples and creating control groups of individuals not reached in some way by the campaigns. Furthermore, 37% (n=7) of the interventions reported positive behavioral effects, and 58% (n=11) reported mixed results (no behavioral effects or negative effects in at least one of the aspects of the intervention), with only 5% (n=1) of the interventions reporting unfavorable results. The quantifiable objectives of social support were not included in any of the studies and, except for two interventions (Keller et al., 2012; Nanney et al., 2016; Mumm et al., 2017), the articles did not report the use of social support measurement.

Table 9 synthetizes how social support was operationalized in the reviewed interventions (detailed information is provided in Appendix 2). Depending on the intervention purpose and design, several sources of social support, with different categories of social ties, were identified and targeted in the selected interventions, including peers, family, teachers, health professionals, programme staff members, community volunteers and friends. It is curious to note that peers systems of support were a solution adopted in most interventions targeting children or adolescents (Puska et al., 1981; Vartiainen et al., 1983; Biglan et al., 1987; Ary et al., 1990; Ellickson and Bell, 1990; Bell et al., 1993; Ellickson et al., 1993; Flay et al., 1995; Vartiainen et al., 1998; Futterman et al., 2001;

Baranowski et al., 2003; Story et al., 2003; Hirst et al., 2009; Hightow-Weidman et al., 2011; Nanney et al., 2016; Mumm et al., 2017) and that interventions focused on people diagnosed with serious illness (e.g. syphilis, HIV, diabetes) frequently implemented support systems involving specialized technicians, such as program staff, health professionals or both (Futterman et al., 2001; Gallivan et al., 2007; Hightow-Weidman et al., 2011; Plant et al., 2014).

Table 9 - Social support operationalization

Social Support	Frequency	Percentages
Types of social support provided		
Informational	19	100.0
Emotional	18	94.7
Esteem	18	94.7
Network	14	73.7
Tangible	2	5.3
Mechanisms for social support provision		
Group interventions that provided support through peers led by a professional	2	10.5
Group intervention that provided support through professionals	1	5.3
Individual interventions that delivered support through professionals	1	5.3
Individual interventions that provided social support through mixed sources	9	47.4
Combined group and individual social support activities through mixed sources	6	31.6
Sources of Support		
Teachers	6	31.6
Family	10	52.6
Peers	13	68.4
Friends	1	5.3
Community Volunteers	2	10.5
Health Professionals	5	26.3
Programme staff members	5	26.3

Source: Own elaboration

In terms of the types of support being targeted, the interventions privileged informational support, which was provided in all interventions (100%; n=19), as well as emotional/esteem support (95%; n=18) and network support (74%: n=14). Informational support included providing basic information about the harms of current behaviors and the benefits of behavior change, offering instructions on how to perform the behavior change or providing normative information about others' behavior (role models). Esteem and emotional support primarily involved providing the recipient with

confidence and motivation for behavioral change. Network support consisted of reminding social support recipients that others were available to help in the process of personal change. Tangible support was the less common typology of support observed in the reviewed studies (11%, n=2), and it involved the provision of physical assistance, such as money, goods or services (Windsor et al., 1988; Windsor and Lowe, 1989; Keller et al., 2012).

Social support can be delivered in individual formats or in group sessions. As explained by Hogan et al. (2002), this distinction is relevant because delivery design can affect effectiveness and cost. From the total interventions analyzed, 47% (n=9) involved individual interventions that provided social support through mixed sources, meaning the combination of different sources of support, such as family members, peers, health professionals, etc... (Puska et al., 1981; Vartiainen et al., 1983; Windsor et al., 1988; Windsor and Lowe, 1989 Carleton et al., 1995; Flay et al., 1995; Vartiainen et al., 1998; Gans et al., 1999; Futterman et al., 2001; Evans et al., 2007; Gallivan et al., 2007; Richert et al., 2007; Evans et al., 2011; Nanney et al., 2016; Mumm et al., 2017); 32% (n=6) of the interventions opted for combined group and individual social support activities involving various type of providers (Biglan et al., 1987; Ary et al., 1990; Burke et al., 2002; Baranowski et al., 2003; Story et al., 2003; Burke et al., 2004; Hirst et al., 2009; Hightow-Weidman et al., 2011; Keller et al., 2012); 11% (n=2) of the projects involved group interventions that provided support through peers led by a professional (Ellickson and Bell, 1990; Bell et al., 1993; Ellickson et al., 1993; Withall et al., 2012); in addition, 5% (n=1) of the projects involved individual interventions that delivered support exclusively through professionals and (Plant et al., 2014); and finally, 5% (n=1) consisted in group interventions that provided support through professionals (Flynn et al., 1992; Flynn et al., 1994). On the other side, none of the interventions reviewed explored online mediated support. While some interventions made use of websites for promotion activities (eg. Control Your Diabetes. For Life; Move More Diabetes; 5-4-3-2-1 Go!), none described using these platforms, or other social media channels, for support provision.

Social marketing is not a theory in itself, but rather it draws from several bodies of theories and contributions to understand human behavior (Kotler and Zaltman, 1971). Two major interventions claimed to be inspired by "social marketing theory" (Futterman et al., 2001; Evans et al., 2007) and three interventions did not specify any theoretical framework (Windsor et al., 1988; Windsor and Lowe, 1989; Hirst et al., 2009; Hightow-Weidman et al., 2011). For the remaining interventions, several behavioral theories and models guided the development of the marketing plans, as shown in Table 10.

Table 10 - Summary of reported theories/models in the reviewed interventions

Theories/models	Frequency	Percentages	Interventions (Authors)
Health belief model	4	21.1	Ellickson and Bell, 1990; Bell et al., 1993; Ellickson et al., 1993; Burke et al., 2002; Burke et al., 2004; Gallivan et al., 2007; Plant et al., 2014
Variations of social influence model	3	15.8	Biglan et al., 1987; Flynn et al., 1992; Flynn et al., 1994; Flay et al., 1995
Social learning theory	2	10.5	Puska et al., 1981; Vartiainen et al., 1983; Carleton et al., 1995; Vartiainen et al., 1998; Gans et al., 1999;
Social cognitive theory	2	10.5	Burke et al., 2002; Baranowski et al., 2003; Story et al., 2003; Burke et al., 2004
Communications theory	1	5.3	Flay et al., 1995
Social-psychological theory	1	5.3	Flay et al., 1995
Innovation diffusion theory	1	5.3	Puska et al., 1981; Vartiainen et al., 1983; Vartiainen et al., 1998
Theory of reasoned action	2	10.5	Burke et al., 2002; Burke et al., 2004
Social ecologic model	1	5.3	Nanney et al., 2016; Mumm et al., 2017
Theory of planned behavior	1	5.3	Nanney et al., 2016; Mumm et al., 2017
Transtheoretical model	2	10.5	Gallivan et al., 2007; Richert et al., 2007
Attachment theory	2	10.5	Keller et al., 2012
Word of mouth	1	5.3	Withall et al., 2012
Opinion leader	1	5.3	Puska et al., 1981; Vartiainen et al., 1983; Vartiainen et al., 1998

Source: Own elaboration

4.4. Research findings and discussion

In order to get a thorough understanding of how social support has been operationalized in social marketing interventions, the article now focuses on the two RQs that will be extensively examined following the six social marketing benchmarks proposed by Andreasen (2002) and behavioral change theories.

4.4.1. The operationalization of the social support concept in health-related social marketing interventions

Despite not defining measurable goals, some interventions identified leading people to provide social support as a **behavioral change** objective of the programmes. In the Oregon Communities programme (Biglan et al., 1987; Ary et al., 1990), the behavioral objectives included stimulating students to provide support to their peers for refusing cigarettes, and in the Madres para la Salud programme (Keller et al., 2012), the objectives included the enhancement of social support from family and community volunteers for weight reduction. In both cases, marketing actions involved motivating and training selected individuals to provide social support to the main targets of the intervention. However, note that no intervention acted upon the receivers of social support by reinforcing social support skills or their predisposition to receive support. Interventions simply assumed that social support is beneficial and that individuals have a desire to receive social support and have the necessary skills to take advantage of support provision. We found no empirical support in the literature for this assumption. Personality and social psychologists have suggested that how much support a person receives may be as much or more a function of their skills to utilize supportive relationships, as of how much enacted support is actually provided (House, 1987).

Among the articles examined, only two studies reported the analysis of existing social support networks at the **consumer research** stage. In the North Karelia project (Puska et al., 1981; Vartiainen et al., 1983; Vartiainen et al. 1998), a school-based smoking prevention programme, the participants completed a questionnaire assessing normative beliefs, social norms, peer pressures, skills for resisting social pressures, current social support and relationship with parents. In the Control Your Diabetes For Life intervention (Gallivan et al., 2007), during consumer research, the focus group participants identified the lack of social support as an obstacle to diabetes control. The evaluation of existing networks of social support and the extent to which individuals report the need of social support are relevant elements for intervention design. Despite using questionnaires and focus groups, none of these studies reported the subsequent use of more complex tools

to make social support assessments, such as SNA. Formative research could also have been extended to focus on identifying specific social support barriers, required typologies of social support and preferred sources; these elements were not reported in the studied interventions.

Segmentation and targeting involve identifying and prioritizing meaningful population segments relevant to the intervention objectives based on clear criteria (Carins and Rundle-Thiele, 2014; Luecking et al., 2017). When social support is being promoted, intervention designers can target the focal individuals and the social support providers and tailor their actions to the settings in which social support interactions will occur. In some interventions, the target segments included both the social support recipients and providers. In the Pawtucket Heart Health intervention (Carleton et al., 1995), the targeting strategy combined adults in a Rhode Island city with relatively low mean household incomes with community members who could support behavior change. Similarly, in the TVSFP project (Flay et al., 1995), the intervention targeted 7th grade pupils and their parents and other family members as providers of social support. This programme was innovative in the sense that it made the family support reciprocal, with parents supporting children smoking prevention skills acquisition and children supporting parental smoking cessation efforts.

Most of the reviewed interventions included all elements of the traditional **marketing mix** (i.e., product, price, place and promotion), with only two interventions missing information concerning the price element. In addition to the four P's, the Madres para la Salud intervention included a partnership element; the Fit and Fab intervention included a people element, and the Move More Diabetes project included a policy element in the marketing mix. Next, the article discusses how the interventions used social support in connection with the conventional marketing mix.

Promotion refers to the communication channels and tactics used to reach campaign audiences (Gallivan et al., 2007). A strategy observed in several interventions consisted of training individuals (local volunteers, peers, family members) to provide informational support (to the target group) that was consistent with the message being promoted. For example, in the Oregon Communities programme (Biglan et al., 1987; Ary et al., 1990), informational social support from trained peers served as an instrument to promote tobacco cessation. Social support through tailored counselling was a promotion strategy used in the Australian social marketing intervention to promote obesity prevention (Burke et al., 2002; Burke et al. 2004). A different strategy was used in the Check Yourself intervention (Plant et al., 2014), in which an outreach team was

responsible for going into the community to engage the targeted individuals and distributing posters and palm cards to local community members.

In social marketing, **price** can be understood as the monetary, emotional, social, and psychological costs people must bear for product benefits (Evans et al., 2014). In the Control Your Diabetes For Life intervention (Gallivan et al., 2007), the price of the intervention was identified by the authors as the "costs" of overcoming the barriers to diabetes control, including financial, physical, contextual and time barriers. A different dimension of social support "price" is related to the possibility of support inducing undesirable behavior. For example, in Project ALERT (Ellickson et al., 1993), the authors recognized that using classroom teaching to provide informational social support to help prevent substance use had the price of "increased drug-related knowledge" for students. Price can also be tightly connected with the exchange element of social marketing and the provision of tangible social support, including the provision of free syphilis testing in the Check Yourself intervention (Plant et al., 2014).

Product may refer to the actual product, meaning the behavior being promoted, or it may relate to the core product, which translates to the benefits of the desired behavior (Burroughs et al., 2006). An example of social support being identified with the product that is offered can be found in the STYLE intervention (Hightow-Weidman et al., 2011), in which the product consisted of a tightly linked medical–social support network for HIV-infected youth that involved physicians to oversee the provision of care. In this case, the bundle of benefits received by the target audience included professional counselling, better medication adherence and intensified outreach.

The **place** component of the marketing mix included the physical/virtual environments where the social support component of the interventions was delivered. What seems relevant, and can be observed in some of the reviewed interventions, is how the project promoters made the place for social support provision at the most convenient locations. For school-based programmes (Oregon Communities programme, Project BreakFAST and the Vermont intervention), social support was provided in school by regular classroom teachers or peer students. In other cases, such as the Check Yourself intervention, social support agents moved to the places were individuals were more easily reached. The outreach team provided social support by having conversations with men to address their perceived risk for syphilis and to help them overcome their personal barriers to testing.

According to exchange theory, human actions result from subjective cost-benefit analysis and the comparison of alternatives, thus, social marketers must provide strong incentives by emphasizing how the benefits of their offerings outweigh the respective costs (Luca and Suggs, 2013). Several interventions operationalized the social support concept at the **exchange** level. Some examples include the Oregon communities programme (Biglan et al., 1987; Ary et al., 1990), the Pawtucket Heart Health programme (Carleton et al., 1995; Gans et al., 1999), the Vermont intervention (Flynn et al., 1992; Flynn et al., 1994), the Alabama workplace intervention (Windsor et al., 1988; Windsor and Lowe, 1989) and the Project BreakFAST (Nanney et al., 2016; Mumm et al., 2017), in which the exchange component involved offering social support in exchange for the desired behavior. In these cases, the social support provision was considered by the project managers to be a valuable and recognized benefit for the targeted populations, and it was offered in exchange for behavioral change efforts.

As noted by Luecking et al. (2017), intervention design can be strengthened through the explicit consideration of the alternative options that compete with the desired behavioral change (**competition**). In addition to the typical barriers to social support, such as time, monetary and convenience constrains, some interventions explicitly acknowledged that the negative forms of social support can have detrimental effects or compete with the desired behavior. Typical barriers of social support drive from the fact that support interactions involve an outlay of at least some resources (Finfgeld-Connett, 2005; Taylor, 2011). For example, for people to engage in support provision and reception, they need to dedicate their time and attention. On the other side, the possibility of negative social support interactions should also be considered. The literature identifies some of the potential negative consequences of social support, including disappointment, moral obligations to accept or reciprocate assistance, relational conflicts, stress, embarrassment, envy, invasion of privacy, disputes and social aggression (Eckenrode and Gore, 1981; Rook, 1984; Lincoln, 2000; Brashers et al., 2004). For example, in the Oregon Communities programme (Biglan et al., 1987, Ary et al., 1990) parents were enlisted in intervention efforts to provide social support to encourage children not to smoke. However, this strategy did not appear to have impacted children's smoking behaviors. According to the authors, social support relations may have provoked undesired interactions between parents and teenagers in some instances (e.g., parents "cracking down" on teens or arguing with them), which may have offset the supposed beneficial effects of social support. Negative experiences of social support may lead to dysfunctional coping styles and psychological distress. In addition, and as stressed by Peter et al. (2012), social support might lead to an unsatisfactory condition by acting as

a constant reminder of the presence and impact of the problems that motivated the need for social support.

4.4.2. Theoretical reasoning for using the concept of social support in health-related social marketing interventions

As reported in the results section of this review, a wide range of behavioral change theories and models were adopted in the interventions. However, most of the analyzed interventions that claimed to be sustained by a specific theoretical framework did not report in detail how the cited theories were incorporated in the development of the social marketing plans. Note that most of the examined articles only vaguely discussed the theoretical frameworks and did not establish the theoretical rationale to include social support in the interventions. This finding is consistent with previous studies, that have concluded for a lack of use or insufficient reporting of theory in social marketing interventions (Luca and Suggs, 2013; Truong, 2014).

The health belief model (Rosenstock, 1966; Becker, 1974) proposes that health-related behaviors depend on individual perceptions of behavior consequences and perceptions of risk (Burke et al., 2002). Social support can be an important instrument to change peoples´ perceptions of the risks associated with negative health behaviors. For example, in the project ALERT (Ellickson and Bell, 1990; Bell et al., 1993; Ellickson et al., 1993) informational support in the form of school curriculum included elements designed to change beliefs about substance use. The results of this intervention demonstrated that informational support successfully dampened the cognitive risk factors and reduced the perceived barriers to effective resistance to substances consumption.

In terms of the social influence models, variations of the concept of social influence were included in several interventions to predict health-related behaviors and to guide the marketing plans. In the Oregon Communities programme (Biglan et al., 1987; Ary et al., 1990) a social influence theoretical framework, based on social pressure theory, emphasized the role of peers, and posited that the adoption of health behaviors is influenced by explicit social pressure from peers in group contexts, justifying the use of peer social support in the intervention. The Oregon Communities programme also used a variation of a social influence model, based on social communication theory (Biglan et al., 1987; Ary et al., 1990). Under this theoretical perspective, discussions between parents and children served to pass parental norms and values about health-related behavior.

Social cognitive theory (Bandura, 1986; Bandura, 1989) suggests that human behavior can be explained through the interaction of personal factors and environmental influences. A basic tenet of social cognitive theory holds that individuals learn from personal experiences along with observation of the actions and results from other people's behaviors. At a primary level, it is possible to frame the social support concept within social cognitive theory by considering that social support can serve to transmit information regarding other people´s actions and behaviors, thereby influencing individual decisions (for example, an ex-smoker can share his personal testimony of successful quitting, thereby influencing active smokers' decision to also quit). At a secondary level, social support can be linked to a commonly recognized concept within social cognitive theory, self-efficacy. Self-efficacy can be defined as "people's beliefs about their capabilities to produce effects" (Bandura, 1994, p. 2). According to Bandura (1994), perceived social inefficacy increases vulnerability to stress and depression and obstructs the development of social support. Considering Bandura´s assertion, it is possible to consider social inefficacy as a possible barrier to social support. A reviewed social marketing intervention (Burke et al., 2012) targeting young couples and focusing on weight control successfully used social support from spouses (emotional support) and feedback from programme facilitators on dietary progress (informational support) to impact cognitive variables related to health beliefs and self-efficacy for diet and physical activity.

All reviewed interventions approached the concept of social support from a relational regulation theory perspective, in which social support is operationalized with the intent of directly promoting healthy behaviors (Thoits, 1982; Cohen and Wills, 1985; Taylor, 2011; Lakey and Orehek, 2011). With the exception of the North Karelia Project (Puska et al., 1981; Vartiainen et al., 1983; Vartiainen et al. 1998), no other intervention approached the concept of social support from the perspective of the stress and coping theory (Cassel, 1976; Cobb, 1976; Cohen and Wills, 1985; Barrera, 1986; Thoits, 1986), which highlights the role of social support in coping with stressful events. It is also curious to note that no intervention aimed to provide support beyond the main target, including people who, by providing social support to the core segments, can equally be affected in their health status. Social support providers may wear down, become overly stressed become emotionally vulnerable or lose objectivity after providing support for an extended period of time (Hupcey, 1998, Finfgeld-Connett, 2005). For example, parents' ability to provide support for their HIV-infected children, is likely to be influenced by its capacity to obtain external support to mitigate illness related family stress.

The review revealed that, despite using social support principles in the interventions, most articles did not provide an unequivocal definition for social support, with the sole exception of the Madres para la Salud intervention, in which Keller et al. (2012, p. 133) used the definition proposed by Heaney and Israel (2008) and declared social support as "the aid and assistance exchanged through social relationships and interpersonal transactions". The definition of social support in each study is important because differing conceptualizations of social support imply distinct theoretical explanations for its role in social marketing. The structural definitions of social support are usually focused on direct effects and tend to explore the nature of individuals' social networks, while functional definitions typically focus on the buffering effect of social support in stress (Meng et al., 2017). How support is conceptualized and operationalized within an intervention may be indicative of its ultimate success (Hogan et al., 2002). For example, Uchino (2009) suggests that interventions focused on the functional nature of social support need to pay close attention to the literature focused on matching support with different types of stressors. Interventions focused on the structural aspects of social support must focus on interpersonal networks of relationships (Hogan et al., 2002).

Only one intervention (Madres para la Salud) clearly specified the types of social support being operationalized (informational, emotional, esteem, tangible, network, appraisal, instrumental); in all other cases, the nature of social support had to be inferred from the description of the interventions. This finding reinforces the notion that social support is poorly conceptualized in the reviewed social marketing interventions. Not all types of social support are equally suitable for different contexts and situations. Optimal matching theory (Cutrona, 1990; Cutrona and Russell, 1990) posits that the benefits and the deleterious effects of social support are influenced by the matching, or mismatching, of support in different contexts and situations. Researchers must endeavor to clearly define their approach to the social support concept and to provide specific information about the rationale and nature of social support that is being operationalized.

4.5. Final remarks

This review aimed to understand how the concept of social support has been operationalized in social marketing interventions in the field of health promotion. Based on the analysis of the selected studies and the reflection that followed, it was possible to conclude that the social support concept can be approached from different perspectives in social marketing, which are synthetized in Figure 2.

Figure 5 – Operationalization of the social support concept in social marketing
Source: Own elaboration

Next, a resume of the main conclusions of the literature review, in relation to the first research question, is presented.

i) In some interventions stimulating social support interactions was identified as the core objective of the intervention, an objective that required behavioral change from both the potential providers/sources and from the receivers of social support. However, no intervention acted upon the receivers of social support by reinforcing social support skills or their predisposition to receive support;
ii) Formative research was used in some studies to access social support necessities and existing networks. Formative research could also have been extended to identify the specific social support barriers, required typologies and preferred sources of social support;
iii) Segmentation and targeting were used in the interventions to prioritize meaningful population segments to receive social support. Some intervention segmentations were also applied to select and target social support providers;

iv) In some social marketing programmes, social support was operationalized as an element of the marketing mix, including the following;
    a. The consideration of social support as the product/service being offered. In this case, social support relationships were considered to be a capital of service capable of leading to new sets of behaviors or generating new capacities enabling transitions in health behavior;
    b. Social support as an element of promotion. Social support providers became the channels of tailored messages designed to persuade individuals to change health behavioral;
    c. Reflections about the "price" of social support. The reported price components of social support primarily included psychological costs, time and monetary constrains to social support;
    d. The place being identified as the physical or virtual environments in which social support interactions occurred. In this case, there was a clear concern to make the behavior change support systems easily accessible to the target populations;
v) Social support was understood in some interventions as the exchange element of the marketing plan, meaning that support was identified as a relevant benefit for the core targets, and it was provided in exchange for voluntary behavior change attempts;
vi) Finally, competition to social support included social support barriers and the recognition that negative forms of social support can have detrimental effects or even compete with the planned behavioral change.

Concerning the second research question, it was possible to conclude that in most interventions social support was poorly conceptualized. The results of this review indicate that only one article defined social support (Keller et al., 2012), and none explicitly referred to a social support theoretical framework, including the two theoretical perspectives that inform most traditional social support literature: the primary effects and the stress buffering models. From the analysis of the articles it was possible to infer that most interventions were focused on the primary effect of social support, while the possibilities of exploring the compensating effect (i.e., stress buffering) of social support were rarely approached. Social marketing research has explored how individuals implement behavior change, but there has been less emphasis on how they can cope with the cognitive and emotional aspects of engaging and maintaining change (Logie-Maciver and Piacentini, 2011). The role of social support as a coping resource in stressful situations has long been recognized in social support

literature (Kim et al., 2010; Mattson and Hall, 2011). Under conditions of pressure related with behavior change, social support can act as a buffer by lessening the adverse effects of stress. Finally, most of the reviewed interventions were based on behavior change theories; however, none comprehensively established a theoretical rationale to operationalize the social support concept.

This research bears some lessons for practice, as two notable findings have emerged: despite the use of the term, most interventions do not clearly report the theoretical rationale to operationalize social support and interventions often lack a social support outcome measurement component. Theory can help practitioners to understand the underlying systems that determine behavior change, to better explain relationships between different factors that impact behavior, to improve the efficacy of interventions and to make predictions and generalizations for similar phenomena (Luca and Suggs, 2013; Manikam and Russell-Bennett, 2016; Basil, 2019). In addition, and to fully understand the effectiveness of the social support option, more frequent (and consistent) reporting of social support measurements and results in social marketing is needed. While many programs were successful, it was unclear from this review how the social support components of the interventions were responsible for these results. In the few studies that measured social support, it was mainly recurring to self-report questionnaires. It is important to measure social support provided and not only self-reported, which may be affected by the personal characteristics of the recipients.

Our study also has implications for social marketing academic debate. The social support concept has garnered interest from scholars across a large range of health sciences. However, the reduced number of interventions found in the literature search is an indicator that, despite the importance of social support in health studies, the concept is still under-applied from a social marketing perspective. The paucity of interventions may be related with the lack of conceptual and theoretical studies exploring social support from a social marketing perspective and providing a theoretical background to field interventions. When commenting barriers to the adoption of social marketing, Andreasen (2006) highlighted the relevance of conceptual and theoretical material to increase the discipline's base and the importance of social marketing contributions to related fields, to gain academic status.

Chapter 5 – Examining social capital and online social support links: a netnographic study in online health communities facing treatment uncertainty

5.1. Introduction

Uncertainty has been widely recognized as an important construct in health care and can be experienced in relation to various aspects of the medical condition, including health treatments (Brashers et al., 2004; Dean, 2016). For several health treatments there is considerable scientific and medical uncertainty about the extent to which they can be effective, about the health risks they pose or if the benefits outweigh the harms (Evans et. al, 2011). In light of such uncertainties, health authorities often do not issue clear policy regarding treatments, leaving doctors and patients with the tough task of dealing with treatment uncertainty and taking difficult decisions (Mullins, Montgomery and Tunis, 2010).

Left unmanaged, health uncertainty may produce serious psychosocial effects for patients, including emotional distress, deterioration in relationships, poor decision-making, loss of control, low resourcefulness, and, in general, reduced quality of life (Dean, 2016). Social support has the potential to serve the needs of individuals facing treatment uncertainty and the lack of knowledge and psychological distress that characterize such a condition. Social support can be understood as a transactional communicative process, that includes verbal and non-verbal communication, and that stems from personal relationships (Gottlieb, 2000). Highlighting the role of social support in uncertainty management, Albrecht and Adelman (1987, p. 19) defined social support as "verbal and nonverbal communication between recipients and providers that reduces uncertainty about the situation, the self, the other, or the relationship, and functions to enhance a perception of personal control in one's life experience".

In sensitive situations, such as the ones characterized by treatment uncertainty, social support can come from weak ties, such as casual acquaintances and online friends in OHCs. According to Pena and Quintanilla (2015), such weak ties provide complementing viewpoints, objective and constructive feedback and reduced role obligations without

evoking the social apprehensiveness that might come from attempting to share emotions in face-to-face interactions. Online peer support appears to be particularly useful for uncertainty management, as people that share the same health condition are less likely to be judgmental or to stigmatize (Brashers et al., 2004).

With the growing popularity of web 2.0 technologies, OHCs are becoming a popular component of the digital landscape (Pena and Quintanilla, 2015; Zhao et al., 2016a). The potential advantages of OHCs include the availability of support beyond the restrictions of time, geographic proximity and costs, reduced stigmatization and customizable information to meet one's needs (Coulson, Buchanan and Aubeeluck, 2007; Zhang et. al, 2017). Despite the growing importance of OHCs, there is still a dearth of research evaluating the interactive and reciprocal nature of support exchange that occurs in online forums (Pan et al., 2017; Urbanoski, Mierlo and Cunningham, 2017) and, to the best of the authors´ knowledge, no single study has specifically focused on online support interactions in contexts characterized by treatment uncertainty. By addressing this gap in knowledge, the results of the study provide significant insights for academics and practitioners interested in the topic of health uncertainty management, which can be used to program future interventions intended to enhance the quality of social support available in OHCs.

To attain the objectives of this study we have applied social capital theory. The theory of social capital can be used as a practical framework for exploring the context of social support interactions in OHCs (Ellison, Steinfield and Lampe, 2007; Ryan et al., 2008; Loane and D'Alessandro, 2013; Green-Hamann and Sherblom, 2014; Bae, 2015). Loane and D'Alessandro (2013) identify social capital as resources embedded in social structures and consider that in online communities such resources include social support, which is said to be available to individual participants through acts of generalized reciprocity, facilitated by trust. According to Drentea and Moren-Cross (2005), online communities provide social capital in that it is an embedded community asset activated for purposeful action. The social support created from such reserves of social capital can be realized by individuals or may simply come to exist as potential resource to be tapped at some point in the future, if the person ever needs (Mathwick, Wiertz and De Ruyter, 2008). According to Resnick (2001), social support is not only substantiation but also an outcome of social capital because social capital provides individuals with connections to receive and provide support. As social support is provided in OHCs, social capital builds through trusting relationships, and the presence of social capital facilitates the production of further acts of goodwill in the form of generalized exchanges of social support (Loane and D'Alessandro, 2013).

Our conceptualization of social capital draws from the work of Nahapiet and Ghoshal (1998) who define social capital in terms of three distinct dimensions; i) the structural dimension, which refers to the overall patterns of connections between actors; ii) the relational dimension, which reflects the quality of relationships and builds on the principles of trust, reciprocity, norms and obligations and social identification; and iii) the cognitive dimension, which relates to unified systems of meaning and is seen to affect the capability of community members to develop a mutual interpretative framework through common language, codes and shared and accepted narratives. Within the structural dimension of social capital and of direct relevance to this study is also the work of Putnam (1995; 2000), who established a differentiation between bonding and bridging social capital. According to the authors, bonding social capital refers to relations in networks that contribute to the development of strong ties, reinforcing common identities and functioning as a source of trust and support among network members, while bridging social capital is characterized as connecting subgroups or individuals across weaker ties, providing positional advantages within a social network through access to new information and opportunities. Finally, we highlight the concept of linking social capital, which was introduced more recently by Simon Szreter and Woolcock (2003), and is based on the notion of vertical ties or hierarchical and unequal relationships between actors due to differences in power, resources or social status.

In terms of methodology, this chapter adopts a dual case-study and a nethnographic approach to examine social support interactions in two distinct OHCs where users face considerable treatment uncertainty: i) an online forum dedicated to health discussion about vaping, meaning the use of e-cigars, and; ii) a forum centered on the topic of HRT for women experiencing menopause. The objective of the present chapter is to generate knowledge on how OHCs are serving as platforms of social support for groups of individuals that are subject to treatment uncertainty. More specifically, we aim to investigate participant behavior and understand how structural, cognitive and relational social capital affect support interactive relationships within the OHCs. Thus, the present chapter adds to the field of knowledge by focusing on the following research questions:

RQ4: How does the structural dimension of social capital, reflected in the patterns of connections between users, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?

RQ5: How does the relational dimension of social capital, expressed by reciprocity, trusting relationships, groups' norms, obligations and social identification, influence the

conditions for social support exchange in these OHCs where users face treatment uncertainty?

RQ6: How does the cognitive dimension of social capital, including shared language, codes and accepted narratives among parties, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?

The remainder of this chapter is structured as follows: First, we discuss the method and data collection procedures. The following section includes the data analysis. Next, we discuss the study's main results and, in the last section, we present the conclusions of the chapter.

5.2. Methodology

This chapter employs a combination of case studies and netnography. Qualitative case studies allow for rich and naturalistic data to be extracted. Moreover, a multiple case study approach allows contrasting findings from individual cases to identify idiosyncratic and more-prevalent tendencies (Yin, 1994). In turn, netnography permits a deep exploration of complex social interactions by analyzing people's online discourses and practices (Brennan, Fry and Previte, 2015). This method is inherently flexible, naturally exploratory, less expensive and less time-consuming than traditional ethnography enquiry, allowing researchers to study human behavior in a natural environment in an unobtrusive or more participative manner (Kozinets, 2002). Given the sensitive nature of the topic and particularly its online suitability, netnography was considered an appropriate method for this research project. The application of netnography in this study followed the steps suggested by Kozinets (2002; 2010), namely: planning and cultural entrée, data collection, data interpretation, compliance with ethical standards and research reporting. These steps are detailed in next subsections.

5.2.1. Planning and cultural entrée

An important first step in the study was identifying the appropriate setting for data collection. Two OHCs were selected based on the recognized uncertainty surrounding the specific therapies (Pisinger and Døssing, 2014; Velentzis, Salagame and Canfell, 2017; Liu et al., 2018; Nudy, Chinchilli and Foy, 2019; Vermeulen et al., 2019), the familiarity of the researcher with these treatments and the level of member engagement in the OHCs, which included enough messages to provide a robust sample of

approximately 200 messages per month in each forum. The selected OHCs were an online forum discussing e-cigar health issues (the "VAPE" forum) and an online forum dedicated to menopausal HRT discussion (the "HRT" forum). Other online platforms were also analyzed to evaluate the richness of contents, including Facebook and Twitter channels dedicated to vaping and HRT. However, these compared unfavorably with internet forums in terms of the number of users, number of messages, between-member interactions and specificity of textual conversations. As for the "cultural entrée" (Kozinets, 2002; Kozinets, 2010), because it involves a form of data collection, the details are provided in the next subsection.

5.2.2.Data collection

Netnography studies can elect participative approaches, which are closer to traditional ethnographic standards, or be purely observational where the researcher adopts a passive stance, observing the online interactions but not contributing to ongoing online communications (Kozinets, 2002; Kozinets, 2010). Non-participant approaches ensure more naturalistic and unobtrusive observation in that the dynamics and behaviors of the examined communities are not influenced by the researcher's presence (Nimrod, 2010). In turn, participative approaches provide researchers with opportunities to gain richer and encompassing insights by incorporating participants' perspectives, allow triangulation, and permit cocreation processes in which the researcher and community members work together in the benefit of the community (Kozinets, 2010; Costello, Mcdermott and Wallace, 2017). To take advantage of both approaches, this study began with a passive, descriptive, and observational phase, followed by a participant-observational stage (Costello et al., 2017).

Over a 12-month period, starting in October 2016, we conducted intermittent participant-observational fieldwork by joining both OHCs in a passive role, without introducing his presence. This form of engagement served as a "cultural entrée" providing the researcher with a detailed appreciation of community dynamics and the forums' norms and culture. To ensure control of the research process, we recurred to a protocol and wrote analytic introspective memos during the whole observational stage. In October 2017, after formally announcing the study to the OHCs, we retrieved the 200 most recent threads in the two forums, using a web scraper (FMiner.com, 2009), and started to engage in direct interactions with online community members. The threads retrieved correspond to two years of interaction in the VAPE forum and one year and ten months in the HRT forum. The VAPE forum sample was composed of 6.987 unique messages, posted by a total of 997 forum members. The HRT forum sample comprised

4.739 online messages from 575 forum users.

In relation to the participant-observational stage of the research, it lasted between October 2017 and February 2020. During this time we deeply immersed in the communities, by reading the posts, engaging in informal computer-mediated conversations with key active members (including forum moderators), offering comments and creating new threads in the forums to stimulate conversations on topics significant to the study's goals. These topics included: i) motivations of users to participate in the OHCs; ii) users' expectations of support reciprocity; iii) users' interpersonal trust in other forum members; iv) appropriate behavior and community norms; v) users' perceptions about the formal health care system; vi) discussions about the study's results. This prolonged engagement was utilized as a form of triangulation, while also providing enhanced cultural fluency (Kozinets, 1997). Finally, and after the preliminary research conclusions were drawn, the findings were presented to six members of the VAPE forum and three members of the HRT forum for "member checks", as recommended by Kozinets (2010).

5.2.3.Data interpretation

The data analysis method for the netnographic study consisted of content and thematic analysis. Following Braun and Clarke (2006) and Kozinets (2010) recommendations, the main analytic steps included: i) familiarizing with the data through the cultural entreé and reading the whole dataset; ii) generating initial codes iii) code testing; iv) coding; v) searching for relevant themes; vii) reformation of themes; viii) defining and naming the final themes; ix) analysis and intermediate reporting; x) member checks; and xxi) final reporting.

To identify salient themes within data we followed a hybrid method, involving both the use of deductive and inductive approaches to coding, an approach that is consistent with the principles of critical realism (Bhaskar, 1978). An hybrid approach improves the rigor of a qualitative study, since it provides balanced coding data based on an existing framework (initial codes) while at the same time being open for new codes that might emerge from the data (Fereday and Muir-Cochrane, 2006). The initial codes were developed based on Nahapiet and Ghoshal's (2008) dimensions of structural, relational and cognitive social capital previously mentioned, and Cutrona and Suhr's (1992) SSBC.

Table 11 - Typologies of social support

Support Type	Description
Emotional support	
Relationship	Conveys the importance of closeness and love
Sympathy	Expresses sorrow or regret for the recipient's situation
Understanding/empathy	Expresses understanding of the situation
Encouragement	Provides the recipient with hope and confidence
Prayer	Prays for the recipient
Informational support	
Advice	Offers ideas or suggestions for action
Referral	Refers the recipient to external sources of information or help
Self-disclosure	Reports of personal experience
Teaching	Provides detailed information, facts or news
Esteem support	
Compliments	Says positive things about the recipient or emphasizes the recipient´s abilities
Validation	Expresses agreement with the recipient´s view on the situation
Relief of blame	Alleviates feelings of guilt the recipient has about the situation
Network support	
Access	Provides the recipient with access to new network resources
Companions	Reminds the recipient that there are others who share similar interests and are available

Source: Own elaboration, developed based on Cutrona and Suhr (1992)

The researcher and two field experts discussed the applicability of the SSBC and revised category definitions to make it suitable for the online environment and the context of study (see Table 11). First, the code testing phase led us to consider a new sub-category of informational social support not included in the SSBC and that we labelled as "self-disclosure". For the purpose of this study we define self-disclosure as a form of informational support in which individuals report their own experience in relation to a certain health matter. Second, we decided not to use the SSBC's sub-category of "situation appraisal", consisting in reassessments or redefinitions of the situation (Cutrona and Suhr, 1992), because often this type of support was not clearly distinguishable from "teaching" and "advice" forms of support, and we intend to maintain the sub-categories mutually exclusive. Third, we excluded the SSBC's sub-categories of "listening", "physical affection", "confidentiality" and "presence" because these are not applicable in public OHCS where communication is written, and physical contact does not occur. Fourth, in the network support, we adopted a broader definition of "access" support, by considering that it includes providing the recipient with access to new companions, as in the original model, and other resources that are available and are specific to the network, such as forum guidance. Finally, we decided to exclude all categories of tangible assistance due to their exceptionally low frequency. As observed in

previous studies, the provision of tangibles in OHCs is hindered due to the geographical distance of community members and the natural difficulties imposed by the online environment (Loane et al., 2015; Gariépy et al., 2016). The author coded postings from the communities using those identified categories. Nvivo, the qualitative data analysis software, was used to code the retrieved data consisting of online conversations.

5.2.4. Compliance with ethical standards

This study followed Kozinets' (2002) ethical guidelines for netnographic research, with a single exception. The ethical procedures included: i) disclosing the researchers' presence, affiliations, and research objectives to the OHCs and its participants; ii) securing the confidentiality and anonymity of all participants, by using pseudonyms instead of forum´s nicknames and not disclosing the name of the OHCs iii) searching and incorporating feedback from members of the OHCs being researched, through members' checking.

In relation to Kozinets' (2002) suggestion to obtain permission for data use and quotations, we followed the principle of Langer and Beckman (2005), which considers that for nethnographic analysis of online conversations in public forums there is no need to request authorization for the collection and direct citation of the data. Furthermore, it would be highly unusual to seek permissions to quote texts publicly available (Dornyei and Gyulavari, 2016). Note that after the process of passive observation and extraction of forum posts, we created a new thread in each forum where we fully disclosed our presence, affiliations, and objectives of the research with no objections to the study being raised by any participants, including the forum owners, monitors or the users.

5.2.5. Research reporting

The research report involves a description and an analytic text with variations in levels of abstraction (Kozinets, 1997; Langer and Beckman, 2005; Isupova, 2011). To facilitate the interpretation of the categorical themes the findings of the study are ordered thematically, and topics were subjected to cross-case analysis. For accuracy in representing user interactions, all quotes provided for illustrative purposes were copied directly from the forums and were not edited for syntax, errors or profanity terms.

5.3. Data Analysis and findings

The netnography research allowed us to emerge in the subculture of both OHCs to study social support interactive processes and characteristics of collective behaviors in connection with the various dimensions of social capital, as illustrated in Figure 6. As expected in netnographic studies, the result is a "thick description" of forums' members online "life world" (Kozinets, 1997; Langer and Beckman, 2005; Isupova, 2011) which is difficult to fully reflect in this thesis, due to the necessary limited length of the text, which must follow limits of adequacy and reasonability. Nevertheless, we believe that the following résumé of the study's main findings is sufficiently deep to provide a general idea of the main results. Results will be presented according to the different dimensions of social capital.

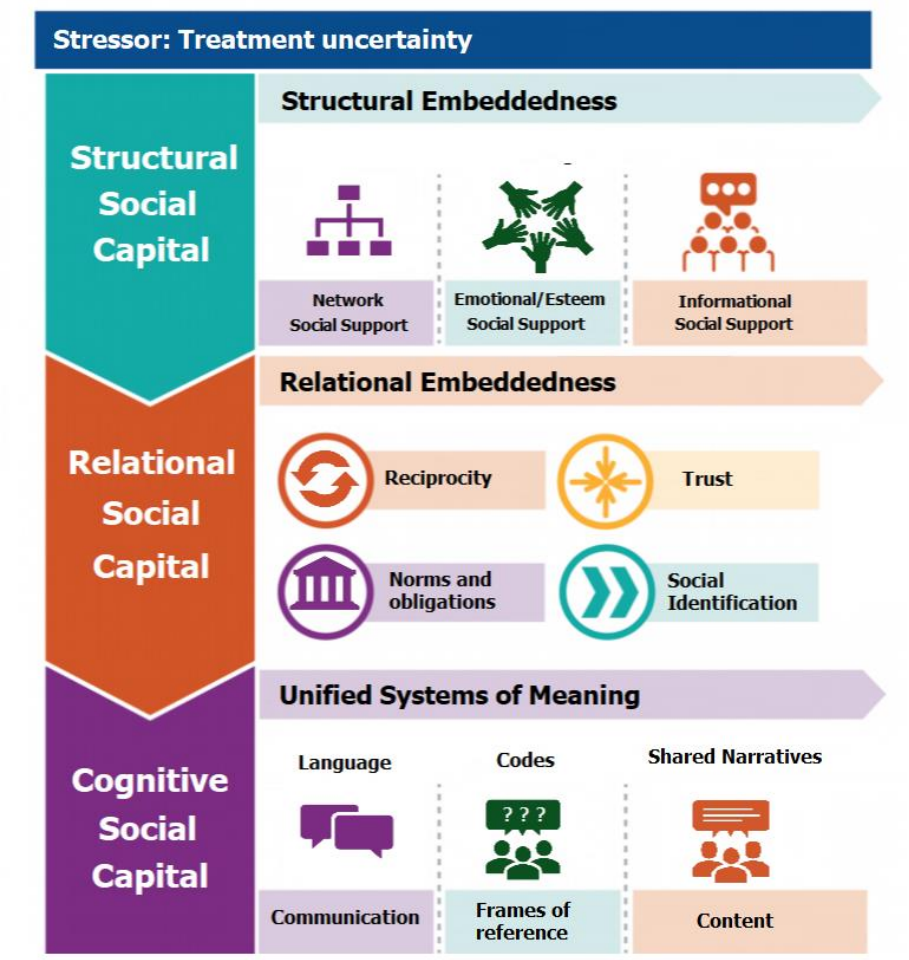

Figure 6- Framework of analysis for the netnographic study

Source: Own elaboration

5.3.1. Structural social capital

The structural dimension of social capital reflects the patterns of linkages between actors and is rooted in the notion of "structural embeddedness", which concerns the properties of the social system and of the network of relations (Nahapiet and Ghoshal, 1998). As such, this section provides a qualitative analysis of the patterns of social support linkages in the OHCs under study.

Under the framework of social support, informational types of social support are the instrument by which knowledge sharing occurs in these OHCs. Informational social support was found to be the most sought after and offered form of social support in both forums, meaning that in conditions of treatment uncertainty, the main value inherent in a virtual community's social capital system appears to reside in the informational support that is there to be tapped. As can be observed in Table 12, forum members mostly search for self-disclosure and teaching forms of informational support in both OHCs.

Perceptions of uncertainty influence individuals' decision to seek the personal testimonies of people facing similar health conditions in the OHCs. Health knowledge, based on personal experience, is an informational resource that is highly valued by the communities. Content of the posts requesting self-disclosure in the HRT forum primarily consisted of questions trying to establish if HRT secondary effects or circumstances are normal and if HRT had worked out for other members. In the VAPE OHC, users' accumulated knowledge, based on personal experiences of people that are transitioning from tabaco smoking to vaping is also a resource valued by the community. The provision of informational support in the form of self-disclosure can be interpreted structurally as bridging social capital in the sense that it brings together unknown people, across social divides, with different backgrounds and levels of experience in the forums. Both senior and less experienced members offer self-disclosure support by describing their personal experiences with these treatments at different stages of the treatment experience, providing the community with a range of informational support resources based on first-hand experience.

Some forum members appear to be deeply knowledgeable in the areas of interest to the forums and respond to solicitations by providing technical, factual or scientific information about the related situations and suggestions for action. The provision of teaching and advice informational support means that some members have the confidence, or sense of self-efficacy, to argue for their own expertise in the subject and present themselves to the community as experts. When viewed from this perspective,

linking social capital may have an influence that is more meaningful. Linking is a vertical form of social capital between actors with different power, resources, and status, which gives access to resources beyond bridging and bonding forms of social capital. While self-disclosure may transverse expertise boundaries, teaching and advice forms of support are mostly provided by knowledgeable and experienced users (at a higher level of the forums' social hierarchy) to unexperienced members.

Table 12 – Sub-categories of informational social support in the HRT and Vape forums

Informational support type	HRT illustrative quotes and frequencies of each category		VAPE illustrative quotes and frequencies of each category	
	Requested (n=499)	Provided (n=3323)	Requested (n=229)	Provided (n=5631)
Advice	"The supply of my patch ... has run out Nationally and as alternative I've been prescribed the equivalent tablet. Not sure when to start taking it as I dont want a gap. Can anyone advise please?" (n=35)	"I feel like if you don't get to feeling better with one doctor, and if they won't change things so that you do feel better, change doctors." (n=426)	"I wiped down the mod and tank with alcohol wipes. Any advice so I can use this thing in the future?" (n=16)	"Do not reduce nic too soon or too fast since doing so might have you jonesing for a cig." (n=866)
Referral	No instances of requested referral support (n=0)	"Look for "The Wisdom of Menopause" by Dr Christiane Northrup ...as well as books on menopause by Dr Sandra Cabot. Their studies will support you." (n=43)	"I just wanted some people to chime in with some case studies or some relevant articles about the content's of vapour against the contents of tobacco smoke." (n=9)	"Do yourself a favor and watch the documentary: A Billion Lives" (n=311)
Self-disclosure	"Hi just wondered what patch your on and how long did it take for the symptoms to subside. I also wondered did you have any bloating or weight gain?" (n=311)	"The way I endured it was I told my doctor I needed a prescription for Xanax (yes, I know you can get addicted - but if you take it only when you have really bad episodest)." (n=1996)	"I have what's called an innocent heart murmur, but I also have un treated Sleep Apnea...is there anyone who vapes and has a heart murmur, is there any concern?" (n=121)	"From my own experience, I can confidently say I am WAY less addicted to ejuice with nicotine than I was to cigs. I believe when I read nicotine in and of itself is little more addictive than caffeine." (n=2526)
Teaching	"I've looked on the box it's a 3.3 mg estradiol that i have been given. do you think this is high? i didn't know about different dosage etc..." (n=153)	"That suffering is because damage to health is happening. Our body thrives on oestrogen." (n=858)	"It´s the cold sweats and hard coughs that have me perplexed. Maybe the cold swats are from nic withdrawl? " (n=83)	"Hard coughs. Also perfectly normal for quitting smoking. ...The combination of quitting and the addition of the vapor tend to loosen that shit up. Your body wants to get rid of it, so you cough it up." (n=1928)

Source: Own elaboration

Most occurrences of emotional and esteem support in both OHCs are unrequested, meaning that users of these OHCs spontaneously decide to provide comfort and demonstrate affective appreciation for other users (Tables 13 and 14). Unsolicited emotional and esteem support in both OHCs, although apparently a "mismatch" (Cutrona, 1990; Cutrona and Suhr, 1992), seem to play a key role in the forums by allowing members to better cope, contributing to trust development and reinforcing a sense of community between members. In fact, emotional and esteem forms of support are more frequently exchanged between the habitués of the forums (users with higher and more frequent post activity). As such, we interpret structurally emotional and esteem forms of social support as evidence of bonding social capital. Bonding social capital reflects the nature of stronger social ties connecting members of the OHCs and that foster the building of trust and cooperative relations among the more active network members reinforcing the sense of community.

For many women menopause life changing events create negative emotions, considerable stress and uncertainty, affecting their social identity and social relationships. Ironically, menopause may often undermine one of the strongest potential resources people have for coping with health conditions – the social capital (bonding) available from intimate social relationships, as captured in Karen's words:

> "In general, unless someone has been thru the HELL of menopausal disaster, they [doctors] have absolutely no empathy. My husband's advice is to get an apartment for him to live in temporarily until the madness resolves…Even the dog suffers, I'm sure. …This must be addressed as many marital problems and divorce occur at the onset of hormonal changes…Maybe divorce rates could be lowered by acknowledging that this monumental life change plays a large role in relationship degradation assisted by women's (and men's) internal biological warfare just when life becomes interesting"

Expressions of loneliness, anguish, and distress are frequent in the HRT forum. The forum seems to be a trusted environment for women to talk with peers about isolation, fear, shame or despair in an atmosphere of mutual support and acceptance. These comments are normally followed by other group members offering unsolicited emotional support and trying to cheer up the person by reminding the member in need that he is not alone, that others shared similar experiences and have been able to achieve successful health outcomes.

Table 13 – Sub-categories of emotional social support in the HRT and VAPE forums

Emotional support type	HRT illustrative quotes and frequencies of each category		VAPE illustrative quotes and frequencies of each category	
	Requested (n=6)	Provided (n=659)	Requested (n=1)	Provided (n=322)
Relationship	No instances of requested relationship support (n=0)	"That's great I am very happy to hear you are back to normal and feeling better. I will be thinking of you." (n=6)	No instances of requested relationship support (n=0)	"I care a lot about my fellow vapers and really care about helping those out there that are still addicted to tobacco" (n=0)
Sympathy	No instances of requested sympathy support (n=0)	"I´m sorry to hear that your having issues with your physicians taking your symptoms seriously. That is very frustating." (n=487)	No instances of requested sympathy support (n=0)	"I'm sorry your children went through that but I am glad you have made such incredibly hard and healthy decisions as well as the willpower to keep it going." (n=217)
Understanding/empathy	"You know what its like when you are desperate for this last ditch attempt at another hrt to work!!" (n=4)	"I know it is horrible to feel this way, like you are not yourself anymore. " (n=97)	"I´m sure a lot of you know all too well the "rationalizations" we were, or using to keep firing up the cancer sticks despite what was happening	"I am sympathetic, we all went thru it." (n=50)
Encouragement	"Any words of encouragement would be great please." (n=2)	"stick with it....you will feel so much better" (n=65)	No instances of requested encouragement support (n=0)	"So I'd say, way to go, keep it up, and before you know it... you'll be a non-smoker." (n=52)
Prayer	No instances of requested prayer support (n=0)	"Ahh..bless u! God bless you." (n=4)	No instances of requested prayer support (n=0)	"my heart and prayers go out..." (n=3)

Source: Own elaboration

In the VAPE forum, a discourse of shame and guilt often featured in members' self-descriptions about their tobacco consumption habits and their failed attempts to quit through vaping. Most exchanges of emotional social support in the VAPE forum aim at reducing or managing emotional distress associated with smoking cessation. In this next example, Derrick presented himself as a failure to the community and reacted in a shameful way:

> Derrick: Driving through Virginia a few weeks back didn't help. $38 for a carton of brand name cancer sticks… I just couldn't pass up on the opportunity to kill myself!! …For now, just feel bad for me.

In response, statements of encouragement provided by other forum members seem intended to provide the recipient with hope and confidence in his abilities to replace tobacco with vaping. For example, Freddie wrote:

> Freddie: Remember it isn't about the ones you smoke… it's about the ones you don't. Keep on fighting the good fight, you'll get there when it feels right for you.

In the HRT forum, women frequently report experiencing physical and psychosocial stressors related with difficulties in adjusting to menopause symptoms. Social support in the form of "validation" in the HRT forum serves to remind recipients that others understand and share similar situations and viewpoints. Compliments offer praise for the individual and note their abilities or attributes when facing stressful menopause experiences. In the VAPE forum esteem validation support mostly focuses on shared experiences of health symptoms associated with vaping and includes varied situations in which support providers express agreement with other members' perspectives or viewpoints. In this OHC, we also observe some esteem support in the form of relief of blame. These messages were directed to alleviate another's feelings of guilt for not being able to quit smoking and involved forum members trying to persuade others that they were not to blame, by providing accounts of their own experiences of failur

Table 14 – Sub-categories of esteem social support in the HRT and VAPE forums

Esteem support type	HRT illustrative quotes and frequencies of each category		VAPE illustrative quotes and frequencies of each category	
	Requested (n=6)	Provided (n=659)	Requested (n=1)	Provided (n=322)
Compliments	No instances of requested compliments support (n=0)	"Very informative post which I know will help lots of ladies. It really illustrates how we are all individuals!" (n=102)	No instances of requested compliments support (n=0)	"Thank you for a very well written article on this topic. It is very very good to see the info you have come up with." (n=230)
Validation	"I am feeling a bit better. I don´t feel so angry all the time. I guess that is a good thing, right?" (n=10)	"You're correct in that we're all different and I completely agree with you when they start messing our our hormones we get out of whack" (n=124)	""Ceremony" is such an interesting and apt choice of words for smoking that analog isn't it?" (n=16)	"I agree with you about the nicotine being the least harmful thing in cigarettes." (n=410)
Relief of blame	No instances of requested relief of blame support (n=0)	No instances of provided relief of blame support (n=0)	"Sorry, it's just that everyone is giving me shit for it" (n=3)	"Do not beat yourself up for the monstrous decisions YOUR ADDICTION made FOR YOU. Those decisions are NOT, by any means, what makes you who YOU, truly, are" (n=24)

Source: Own elaboration

Network social support is relatively uncommon in both OHCs and mostly involves experienced forum users posting messages that provide new members with access to community resources (Table 15). This form of assistance can also be interpreted structurally as an illustration of linking social capital, in which the vertical ties established between more experienced users and newbies provide the latter group with access to new or enhanced network resources. Because of the complexity of HRT treatments and the vast medication terminology and acronyms involved, some women seem to feel insecure when discussing in the forum. As confessed by a forum member in one of the interactions: “I’m having some problems in translating the language you all use”. To facilitate this process of language assimilation, new members are often direct by experienced users to a specific section in the website where users can access basic information about HRT generated by website authors, medical authors (on behalf of the site) and links from the website to reputable health institutions. In the VAPE OHC, network community resources assume the form of referrals to written guides, available in the community's ever-expanding archive, where detailed information about vape lexicon and technology is available. In other instances, members refer to and recommend the expertise of specific users of the forum, as exemplified in the following excerpts of interactions in the VAPE forum between a newbie and an experienced user:

> Susan: … How common is it for juices to have gluten in them? I don't know why this didn't occur to me before, since anything that you ingest, absorb could affect anyone with c.d. Could this be why I sometimes get a bloated feeling when vaping?
>
> Donna: I'm tagging [name of forum member] because of his extensive research and knowledge of our flavorings and bases. He has done wonders for our little community here, and if this is a concern he would be the one to advise.

Table 15 – Sub-categories of network social support in the HRT and VAPE forums

Network support type	HRT illustrative quotes and frequencies of each category		VAPE illustrative quotes and frequencies of each category	
	Requested (n=0)	Provided (n=15)	Requested (n=0)	Provided (n=45)
Access	No instances of requested access support (n=0)	"Don't bother with the general menopause misery group because the Admins kick a lot of people out. The Misfits group is better because it's more relaxed and you can say what you want, including having a good swear if you want to. They are a great bunch of ladies and you will be offered a lot of help" (n=8)	No instances of requested access support (n=0)	"Just a suggestion, since this thread is not a DIY discussion maybe a better place for it is [link provided]" (n=31)
Companions	No instances of requested companions support (n=0)	"you are not alone and can always find support here, so please post when you need to and keep us updated. It helps others too :-)" (n=7)	No instances of requested companions support (n=0)	"If you need a dingy, holler out, somebody will paddle by and help you up into one." (n=14)

Source: Own elaboration

5.3.2. Relational social capital

The relational dimension of social capital is based on the concept of "relational embeddedness", which reflects the particular relations people have, the quality of these relationships and how they influence behavior (Nahapiet and Ghoshal, 1998). The key facets of relational social capital analyzed in this chapter include social support reciprocity, trust in supportive interactions, community identification, norms and obligations.

In chapter 6, were we analyze the structure of social support within the same OHCs, using the SNA technique, we report evidence that reciprocity in social support exists in the VAPE and HRT forums; however, we conclude that the indices of dyad reciprocity, which are calculated as the ratio of reciprocal ties to all ties, are lower than the percentage of reciprocated dyads observed in other OHCs, used for comparison purposes. Despite the observable reduced levels of dyad reciprocity in social support exchange, several users express a belief that the community is there for them if they need support, implying that there is a perception of general reciprocity in the forums. For example, Mary, a highly active support provider of the HRT forum wrote: “The nice thing with this site is that you are not on your own if you need help and it's good to know that”. While the norm of reciprocity prescribes that forum members exchange social support with others, it is not expected that the same person will reciprocate, but rather that there is a sense of generalized reciprocity within the community (Boon et al., 2015).

The norm of generalized reciprocity, involves the intention to provide support without a calculation of value or immediate dyad repayment and can be motivated by altruistic reasons, a desire to help others and see the OHC flourish or based on the confidence that support exchanges will eventually be reciprocal, in the long run, or that payback is in a different currency such as online status, honor or others’ approval (Baker and Bulkley, 2014). Some forum members appear to value being in a position where they can assume the responsibility of helping others without expecting to receive an immediate return. Social support is not only a social capital outcome that resides in the provider and passes to the recipient, but also an expression of mutuality and affection. The relational dimension of social capital is instrumental in establishing such an environment, where actors feel encouraged to provide support by the fact that they manage to help others.

As noted by Li, Chen and Feng, (2013), attempts of people to manage and reduce uncertainty may be accompanied with uncertainty themselves. Besides treatment uncertainty, forum users need to deal with uncertainty regarding the credibility and

intentions of strangers. Considering that members of OHCs count on the advice and intentions of anonymous strangers, the risks and uncertainties that can erode trust are magnified (Mathwick et al., 2008). Trust can be defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer et al., 1995, p.712). The analysis of these virtual communities suggests that members' interpersonal trust in others' expertise and integrity occurs. In numerous occasions users reported the intention to act on the advice and opinions of other members. For example, the next posts are a sample of a request of self-disclosure in the HRT forum and sequent interactions. This exchange illustrates the social normative influences than underlie social support provision in these OHCs and provides an example of how community members trust the advice they receive from other forum members:

> Betty: I have been on Evorel since May and in the past couple of weeks have been upgraded from the 50 to 75. But now am feeling rubbish and was wondering if anyone else had these possible side effects and what they did about them (off HRT completely, take something else etc??)... Thanks x

In the responding posts, the support providers, Ruth and Carol, offer a solution in the form of self-disclosure and advice informational support, while also providing emotional and esteem support, by demonstrating sympathy and providing encouragement to Betty:

> Ruth: Hi, I've been through this! I cut very thin slivers off my patch and it has taken me months for my body to adjust. Too much oestrogen made me feel ill. Very sore breasts, break through bleeds, anxiety.. pretty crap time. But once I started to cut down things got better. I hope this helps.

> Carol: Sorry to hear of your problems. I am 67 and been on Evorel 50/sequi for about 18 months & feel great. Maybe you should have given the lower one a bit longer, takes a few months. No side effects but maybe I have just been lucky. good luck.

The follow-up post suggests that Betty trusts other forum members by declaring the intention to act based on the advice received.

> Betty: Okay I will try that, thank you x.

Women in menopause may experience identity and relational sources of uncertainty as their health declines and they increasingly become reliant on others for support. In the HRT forum, women discuss menopause with other women, creating their own feminine space. Members of this forum share similar demographic backgrounds including gender and proximate age, reinforcing group identification and facilitating trust development. On the other community, members of the VAPE forum develop part of their group identity based on their associations and identification with other vapers in the forum. However, when compared with the HRT forum, the VAPE forum seems a more heterogeneous community. Through our netnographic analysis we observed several occasions in which different sub-cultures with specific interests in vaping interact, as exemplified in the following text posts:

> Javier: Hey, so, I have made another thread about how much I vape...12mg or 18mg on a dripper...(insane buzzes). But a lot of people warned me about heart attacks and strokes... Is there a real serious chance of that happening?
>
> Paul: What people? I know that high levels of nic alone can do that, but the absorption rate via vaping should not be an issue, do you have any links to any studies that indicate that?
>
> Javier: Cause I vape just for the buzz... I don't even think I'm addicted to nicotine... I can not vape for days if I want, I use it more like a drug, a stimulant... I know it's not right, but I like it.
>
> Paul: Oh, My mistake, I thought I was helping someone who was vaping to quit smoking.

Some forum members appear to assign a fashion dimension to vaping. Based on their posts we concluded that this group of members mostly includes young people that vape because of the “cool factor”, highlighting the appeal of vaping as a form or risk, rebellion and youthful status. A second group of members integrates individuals that are devoted to vaping as a pleasurable hobby. These users can better be understood from the perspective of a "subculture of consumption", which is defined by Schouten and McAlexander, (1995, p.43) as a “ distinct subgroup of society that self-selects on the basis of a shared commitment to a particular product class, brand, or consumption activity”. Traces of this sub-culture of consumption are evident when members of the forum share their vaping related stories, explain with passion the vaping devices they use, their preferred e-liquids, or how they self-assemble their own coils and e-liquids, instead of

buying pre-made. Finally, we have the largest group of forum users that understand vaping as a simple mechanism to auxiliate tobacco cessation.

Members of OHCs are guided by community norms when they interact with others in the forums. A norm is "a social pressure guiding an individual's behavior" (Hsu and Chang, 2014, p.124). In both OHCs novice users are formally introduced into the forum norms through a specific section in the websites, where a group of instructions and norms of etiquette are provided. Forum moderators and senior members both control and discipline appropriate behavior when new members interact in the forums. However, some norms are not written, they result from implicit obligations that are imposed within the context of personal interactions. Newcomers to the OHCs must learn to enact such norms and obligations, and long-term members interact with them to keep relations within forums' acceptable framework of social relations. For example, in the HRT forum members are promptly compelled to provide proper references and source information for any health or medical information they post.

5.3.3. Cognitive social capital

The cognitive dimension of social capital affects the capability of actors to develop a mutual interpretative framework within which community members may share a vision and values (Pedrini et al., 2015) by including those resources that provide shared representations, interpretations, and systems of meaning among parties, such as language, codes and accepted narratives (Nahapiet and Ghoshal, 1998).

According to the testimonies available in the communities, several members discover the forums and do not immediately participate in message exchange, they just observe, or "lurk". Lurking is a common phenomenon in online communities where people initially learn about a community from its periphery, not participating in message exchange and just observing the actions of others (Mathwick et al., 2008) or reading older posts. The process of lurking is important because it can provide members with a basic understanding of the forums' language, codes and shared narratives, facilitating cultural integration. Language is the means by which individuals engage in communication. It provides a frame of reference for interpreting the environment and its mastery can be seen as an indication of an individual's level of expertise in the community (Wasko and Faraj, 2005). The VAPE community uses a vast group of terms that need to be learned for people to engage in a fruitful discussion in the forum. Terms such as "chain smoking", "cloud chaser", "mouth-to-lung", "direct lung", "dryburn", "dryhit", "kick", "nic juice", "sub-ohming" are only a few of examples of such specific and vast lexicon. In addition,

there is also the complicated tech terminology associated with vaping, including, for example, the distinction between mech mods, semi-mech mods and full automated mods, concepts such as air flow control, e-liquids and their compositions, etc. Similarly, in the HRT OHC, the very complex nature of hormone treatments complicates discussions in the HRT forum; the risks and benefits of HRT depend on the types of hormone used, the form in which it is given (pills, patches, gels), the timing of its use (pre-menopause, menopause, post-menopause), the duration of the treatment and the condition and physical characteristics of patients. The process of acculturation of new members requires learning about language and the specificity of each treatment as a means to access the network and take advantage of support provision.

Codes provide a frame of reference for OHC users to interpret the environment or context of the online communities (Nahapiet and Ghoshal, 1998). In the VAPE OHC , members move up the community hierarchy by learning to act in accordance with the ethos of the community, based on the quantity and quality of their posts, which are appreciated by other users through a "like" feature, helping them to build status within the community. Extant research has demonstrated that the construction and maintenance of traditional hierarchies within online communities are based on users adhering to appropriate forum behavior (Stommel and Koole, 2010; Giles and Newbold, 2011). "Likes" function as rewards to forum members that adhere to the acceptable shared discourses and act within the forum implicit rules. The VAPE community has a specific set of codes that allows the distinction between different types of members. This includes a system of "trophies" that rewards members' contribution to the forum and that is exhibited near the user's nickname (for example, a trophy level 1 is attributed to all members that posted a first message in the forum, level 2 is given when a member receives his first like, level 3 involves a minimum of 30 messages posted, and so on…). As in the VAPE forum, the HRT forum also possesses a like functionality through which members can express their satisfaction with other members' posts. The total number of posts by each user and the date of adherence to the OHC, which are publicly displayed, signal the seniority of a member and act as a code for status and credibility. As explained by a forum member "It's not always the case, but those who've either been around the longest, or have the highest post counts, or both, are usually more trustworthy".

The analysis of shared narratives in the OHCs revealed that the experiences of members in navigating the formal healthcare system often does not meet expectations, contributing to increased levels of uncertainty. Women in the HRT forum frequently report being unable to attain their medication, or that hormone treatment has been discontinued by their doctors against their will. In their discourses they lay the blame on

the medical community and a rather aggressive attitude towards conventional medical care is manifested. The existence of shared narratives within the community that report negative interactions with doctors, enables the creation and transfer of new interpretations of events in which medical refusal of HRT is identified as evidence of medical professionals being insensitive. This finding is perfectly exemplified in the next quote, from Karen:

> "All we are doing is trying to find competent medical care and treatment so that we can continue to be contributing positive members of society, and not feel like death warmed over while we do it!!! And we have to act all surreptitiously, trying to find this care. I think it is a crying shame that we are treated like this..... or NOT treated."

Members of the HRT forum experience ambiguity when their doctors' recommendations to cease hormone treatment conflict with information they were able to find elsewhere on the internet or when they detect discrepancies between doctors' arguments to cease HRT and available public health guidelines, such as the UK National Institute for Health and Care Excellence (NICE) Report for Diagnosing and Dealing with Menopause, which is generally favorable to the use of HRT. When confronted with medical refusal of HRT, women report frustration and some ask for advice and recommendations in the forum on how to select pro-HRT doctors. For example, one help seeker initiated a thread looking for a 'HRT-friendly doctor' in her residential area. In other cases, forum members ask for information in the OHC on how to acquire HRT medication without script or outside of the institutionalized and legal pharmacy and medication supply systems.

In relation to the VAPE OHC, message exchange about the healthcare system primarily focused on the topic of doctors' supposed lack of knowledge about vaping. Most participants seem to agree that health professionals are a relevant source of information in respect to tobacco cessation. However, community members also consider health professionals as unable to provide answers in relation to vaping because they are not familiar with this practice as an auxiliary method of tobacco cessation. These views can be exemplified in the following posts by Samuel and Rene:

> Samuel: You really can't let your doctor make you feel bad or discourage from vaping. Most of them know shit about vaping. Doctors are experts in their fields, but consider that some of them finished at the bottom of their classes in med school. Besides, what can he say? "Vaping is bad, you should go back to smoking."

> If he says you should do neither, then go find another doctor who understands addiction.
>
> Rene: Since there is likely NO health care professionals out there in the USA took training of the effects of vaping to get their certification….Seems like to me that many of us vapers are actually more educated on health impacts associated with vaping than they are.

Interpretation of the opposing forces against vaping is collectively shared in the VAPE forum and constitutes a prominent feature of the forum's common discourses. A discourse that can best be described as "us the vapers, against them, the forces and lobbies against vaping". From the message exchange we learned that there is a shared understanding between community regulars that vaping is the target of attacks by big tobacco, pharmaceutical companies and the media and that governments have been influenced by industry lobbying, as exemplified in the following exchange of posts in the forum by well-known members:

> Jorge: The single biggest thing that will help vaping is getting government backing unfortunately we are back to political agendas and funding from big tobacco and pharmaceuticals.
>
> Ted: I do NOT trust the government. They are motivated by tax money, not your health. The media needs demons to present as "bad" to vilify to make headlines, and big tobacco and big pharma need to eliminate "competition".

Computer-mediated support groups are not without disadvantages. The context of high uncertainty can polarize opinions and the more interpersonal nature of online communications, the lack of visual cues, as well as anonymity, can encourage attitude polarization and hostility, generating increased prejudices amongst members (Dunham et al., 1998; Coulson, 2005; Parsell, 2008; Isupova, 2011). It was possible to observe that both OHCs are controlled by a critical small group of users that are responsible for most of the occurring support provision. These key users are strong supporters of these therapies and they impose the forums' pro-vaping and pro-HRT narratives. Information by new members that contradicts the core group's collective beliefs and shared narratives about the benefits of these treatments is met with suspicion, and in some cases, verbal aggression, resulting in increased distress. In the following exchange, several members of the VAPE forum violate the norms of good etiquette with their verbal attacks on a

community “newbie” that suggested a relationship between vaping and pulmonary diseases. Dan, the thread initiator, wrote:

> Dan: … I found a peer-reviewed study accepted for publication on Feb 2017: "Recent Updates on Electronic Cigarette Aerosol and Inhaled Nicotine Effects on Periodontal and Pulmonary Tissues".The authors conclude that aerosol nicotine may contribute to lung disease since it undermines the lung's ability to heal via inflammation and via interfering with the critical "myofibroblast differentiation" (the process creating the connective goo in your tissue). In other words, vaping is hard on tissue and it will keep a lung infection parked on your chest indefinitely…

The heated exchange that followed shows how technology can empower a certain kind of collective repression and how the credibility of new members can be put to question when they provide information that contradicts the forum’s shared narratives about the health benefits of vaping. Here are some excerpts of responses from fellow members:

> Ana: What I noticed is how that was that poster's FIRST AND ONLY post at [name of the forum]. And how he was tossing around a term like "myofibroblast differentiation" which is total greek to any layperson, and then use a word like "goo" to define it? Hmm, say my skeptic-cells; something really fishy there.

> Neil: I'm even more skeptical than you if that's even possible.. I note stuff like it's the poster's very first post and he's quoting studies that mention "academic journals" but neglects to QUOTE which journals and which studies… Seems pretty ANTZy to me…

In the response, Dan, the thread initiator replied:

> Dan: Yeah… that was my first post and I gotta say, THANKS for that WARM welcome. I'm touched by your fearless pursuit of knowledge and the health of your fellow vapers, truly….What the hell kind of community is this?

To which, Neil responded:

> Neil: It is a vaping community which has seen and dealt with dudes like you many times. LOL, This is not [reference to an alternative online forum].

The violation of the forum’s shared narratives, by discrediting these treatments, brings a type of uncertainty in initial interactions with strangers that is unwelcome by the core

group of forum users. In turn, social aggression in OHCs may affect the levels of trust, reciprocity and voluntarism in the communities, negatively impacting the quality of social support perceived by new members.

5.4. Discussion

In this chapter we have enhanced our understanding of social support experiences in two OHCs where users face treatment uncertainty. Drawing on Social Capital theory, we examined how structural, relational and cognitive social capital influence the conditions for social support exchange between OHC members. The netnographic analysis depicted OHCs as an environment suitable for social support, which, in turn, is assumed as an initiator of a causal flow towards health outcomes. Optimal matching theory (Cutrona, 1990; Cutrona and Russell, 1990) posits that certain types of social support are more suitable to cope with specific kinds of contexts and situations. According to Cutrona and Russell (1990) matching support types to specific stressors has the potential to improve the design of social support-based interventions. The qualitative analysis led us to conclude that knowledge exchange is the primary motive that leads people to adhere to the OHCs, suggesting that, from the perspective of users, informational support is the typology of social support that better matches the needs of people facing treatment uncertainty. The question then becomes on how social marketeers can further stimulate support exchanges in these OHCs that are geared towards need-matching.

Several behavioral theories are available to explain individual processes of knowledge sharing. Economic exchange theory considers that exchange behavior is influenced by a rationale of self-interest. Accordingly, when an individual feels that the obtained rewards are superior to the corresponding costs, he is willing to share knowledge (Constant et al., 1994; Beer and Nohria, 2000; Ba et al., 2001). The costs of knowledge sharing may include monetary costs, time, energy, among others. In the case of complex and risky choice situations, such as the ones characterized by high levels of uncertainty, to share knowledge individuals may also have to endure the "cost of thinking" (Schaller and Malhotra, 2015) related to the high cognitive effort that is required to search for, compare, and evaluate choice alternatives to construct knowledge that can be shared. Similarly to economic exchange theory, social exchange theory (Blau, 1964) proposes that all human behavior involves benefit maximization and cost minimization. However, in social exchange theory obligations are not clearly specified. In these exchanges, individuals do others a favor with a general expectation of a future return (Emerson, 1976). Therefore, social exchange assumes the existence of long-term relationships, as opposed to a one-off exchange (Chen and Hung, 2010).

Reciprocity involves a form of conditional gains in which people's present actions are expected to generate future benefits (Hung et al., 2011) contributing to present well-being by anticipating future positive rewards. According to Mathwick et al. (2008), the expectation of repayment imposes an informal social control that even obviates the need for more formal, institutionalized control, resulting in a highly efficient stable social system that requires less formal policing. This stability facilitates the accumulation of social capital and further fosters social support provision. It is our contention that social marketing efforts should focus on promoting social support generalized reciprocity in the forums by further stimulating users' disposition to self-disclose.

We observed that both OHCs are controlled by a critical small group of users that are responsible for most of the support provision. These key users are strong supporters of these therapies and they impose the forums' pro-vaping and pro-HRT narratives. Information by new members that contradicts the core group's collective beliefs and shared narratives about the benefits of these treatments is unwelcomed by the communities. By stimulating social support reciprocity in the forums, more users are called to assume the role of support providers, extending the quantity and variety of information available in the OHCs and reducing the level of social control exerted by the core group. The objective is not simply to increase dyadic reciprocity (although, as a result, dyadic reciprocity may increase as well), but to enhance generalized reciprocity, meaning the predisposition of users to provide social support without the expectation of an immediate social support repayment.

A possible route to achieve higher levels of generalized reciprocity is to further promote voluntary self-disclosure. By stimulating self-disclosure forum members are expected to socially acknowledge their own experiences with the treatments, enhancing their levels of self-confidence and self-efficacy, enriching the forums' repertoire of informational support and disrupting the core group's control of the forums' narratives. Andalibi and Forte (2018) noted how reciprocal disclosures in social media occur at the network-level (rather than dyadic) and introduced the concept of "network-level reciprocal disclosure", which refers to disclosures to one's network that occur not in response to any particular support request, but are motivated by a desire to reduce personal stigma. The authors explain how social media awareness campaigns can provide additional safety for self-disclosure, leading to less perceived stigma, and enabling disclosures that may not have occurred otherwise. Sociologists note the ubiquity of giving to others and have shown that individuals derive benefits from helping others, such as reduced distress and improved health (Brown et al., 2003). By reporting their personal experiences, users subject themselves to a process of introspection, from where they can take clues and

evidence that allows them to deal with the uncertainty associated with treatment. As explained by White and Dorman (2001), the therapeutic value of writing about one's thoughts and feelings can alleviate feelings of stress and in this respect, OHCs have a distinct advantage over traditional support groups that is anonymity.

The concept of exchange has long been identified as a suitable framework for social marketing interventions aiming to induce behavior change (Duane et al., 2016), implying that for users to be willing to self-disclose in the forums, they need, in exchange, a perception of objective and immediate benefits. While generalized reciprocity may lead to long term advantages, social marketing efforts also need to emphasize the short term, concrete benefits that accrue to an individual as a consequence of their actions (Lefebvre, 2011). Social exchange theory (Blau, 1964) postulates that individuals can engage in social interaction with the expectation that it will lead to social rewards such as approval, status, and respect. This suggests that one potential way a forum member can benefit from self-disclosure in the OHCs is the perception that it enhances his/her personal status in the network (Wasko and Faraj, 2005). Status is a form of value acquired through being admired or thought of in a positive light by others (Holbrook, 1996). Establishing a reputation and enhancing status can stimulate participants to self-disclose and the social interaction that follows can help users to establish a virtual reputation and gain acceptance and recognition from peers (Yan et al., 2016). Certain features can be incorporated into the forums in order to promote self-disclosure. For example, members who engage in self-disclosure can be rewarded by increasing the visibility of their posts, making them better known to others. This can motivate them both intrinsically, as it gives them status, honor and appreciation, and extrinsically, as this increased attention can help them to attract more social support from other users.

In both OHCs, the HRT forum and the VAPE forum, emotional and esteem support are not commonly requested by forum users. However, members do provide unsolicited emotional and esteem support. Emotional and esteem forms of support, which were interpreted structurally as resulting from bonding social capital, allow members to alter the way they perceive stressful situations and to better cope with alienation and the social stigma that is associated with both their medical conditions and treatment options. Emotional and esteem support also seem to play a key role in trust development within the communities. Behavioral economics and psychology explain the dominance of heuristics compared with rational weighing strategies under conditions of uncertainty (Zinn, 2009). In such conditions, instead of applying rational thinking strategies, people tend to rely more on heuristic-based modes of information processing (mental shortcuts that ease the cognitive load) and on subjective cues for judgment, such as the emotional

and affective responses they are receiving from other members of the community (Schaller and Malhotra, 2015), implying that forum members may trust more fellow users that provide them with emotional and esteem support. On the negative side, trust based on bonding social capital's emotional and esteem attachment in the OHCs can override cognitive weighing of the costs and benefits of these uncertain treatments and drive people to assume excessive health risks.

For an online forum to be considered a community, some type of identification should exist, whereby individuals see themselves as grouped with other members (Chang and Chuang, 2011). Because members in the HRT online community share a health condition and some basic demographic characteristics the level of empathy for one another's life circumstances is understandably high. In the VAPE OHC, we found that distinct and contradictory identities, based on specific consumption interests in vaping, constitute relevant barriers to effective support sharing. How this set of multiple identities within an OHC impacts online communality and the quality of social support interactions is something that needs to be considered by social marketers when planning interventions to enhance online social support, confirming the importance of users' segmentation prior to any intervention and the need to develop strategies for multiple consumption publics.

The cognitive dimension of social capital is seen to affect support exchange in the OHCs because social support requires sharing of context and meaning between partners. In respect to forums´ language, we highlighted how network forms of support facilitate processes of language assimilation in the OHCs through linking social capital. While shared narratives can reinforce group cohesion, they can also negatively affect the quality of support interactions in the forums. Social capital is not an universal good and can have a number of potentially negative outcomes as well as positive (Rothon et al., 2012). There is an evident shared narrative in both OHCs that the health benefits of these treatments outweigh the costs and we found that users can engage in verbal aggression towards new forum members that question the supposed health benefits of these uncertain treatments. The problem of hostile communication in the forums is amplified by the strong social capital bonds that are established between the most active forum users, the inability of forum moderators to enforce rules of politeness and a certain "mob" mentality. A mechanism related to social integration but also to social control and peer pressure is that individuals in a network may feel constrained to behave like other network members (Berkman, 1984). Habitués in the VAPE OHC often unite to attack novice members who dare to question the health benefits of vaping, and the hostile behavior of the core group is rapidly copied by the whole community, who join in the process of hostile communication. In this regard, Arvidsson and Caliandro (2016) have

alerted that because of the immediacy of social media participation, publics are in some sense similar to "crowds" that are driven by affective "waves" of imitation, rather than reasonable and thoughtful communicative interaction.

The credibility and authority of health care providers depends on the capacity of caregivers to provide a coherent explanation of symptom and perceptions of familiarity with the health condition and treatment options (Brashers et al., 2000). When individuals perceive a high level of uncertainty in conventional health care systems, they turn to alternative or complementary sources of information. Participants in OHCs have expertise based upon their personal experiences giving them credibility and authority that may even exceed that of healthcare professionals (Liang and Scammon, 2011). In the OHCs analyzed there is a common discourse that the formal healthcare system fails to provide the necessary guidance because doctors are not well educated in these treatments (VAPE forum) or are insensitive to patients' suffering (HRT forum). Under this context, the OHCs fulfill the scarce level of dialogue and guidance of health professionals and provide the emotional and esteem support patients need. A significant downside is that people with no systematic medical training produce advice in the forums that can be highly variable in quality and accuracy. It is currently recognized that social marketing should involve integrated strategies that consider the downstream (individual), as well as midstream (service, communities) and upstream (policy) levels to achieve societal well-being (Russell-Bennett et al., 2019). Our analysis indicates that users in these OHCs are distrustful of health professionals and that they are confused about government policies and public health guidelines. The degree of skepticism and disappointment among users with the healthcare system suggests that public authorities and health professionals should engage with the OHCs to alleviate these negative perceptions.

5.5. Final remarks

As early as 1995, Goldberg appealed for social marketeers to move beyond the conservative view of focusing on influencing individuals' health-related behaviors towards more ecocentric approaches, which could deconstruct the negative social systems constraining behaviors. OHCs present a practical and convenient means for users to search for health-related information concerning uncertain treatments and obtain support from people in similar circumstances. They can offer a series of advantages over traditional face-to-face interactions, including reduced stigmatization due to anonymity, allowing the discussion of private and potentially embarrassing topics, availability and easier access that minimizes barriers of cost, time and location. However,

we found that the knowledge available in these forums can be conformed to suit the accepted group narratives that reinforce the benefits of these therapies, while neglecting its most serious health risks. The challenge of social marketing consists in promoting a non-judgmental support environment that is conducive to improved decision-making and facilitates psychological processes of uncertainty coping, while overcoming the barriers that arise from group thinking and collective processes of uncertainty management. To achieve this purpose, this study emphasizes the importance of generalized reciprocity in the forums and how the promotion of voluntary self-disclosure can serve to enrich the forums repertoire of knowledge while also reducing the level of social control exerted by the core group of most active forum users.

Chapter 6 – The structure of social support in online health communities facing treatment uncertainty

6.1. Introduction

Uncertainty occurs when situations are ambiguous, complex, unpredictable or probabilistic, when information is unavailable or inconsistent, and when humans feel insecure about their own state of knowledge (Brashers, 2001). The desire to manage uncertainty arises from the necessity to make decisions, to solve problems, to maintain a coherent identity, and to develop and sustain relationships (Brashers et al., 2004).

For several diseases and medical conditions, there is scientific and medical uncertainty about the extent to which specific treatments can be effective and about the relation between the benefits and harms of such therapies (Evans et al., 2011). Evans and Mccormack (2008) argue that when the outcomes of medical procedures are not certain and there may be benefits but also risks associated with treatment options, social marketing should focus on promoting knowledge acquisition and patients' better-informed decision-making. Inspired by Evans and Mccormack's (2008) assertion, and extending their view, we propose that in contexts of treatment uncertainty social marketing can focus on promoting social support.

Social support, understood as a transactional communicative process, that includes verbal and non-verbal communication, and that originates from personal relationships (Gottlieb, 2000), may potentially serve the needs of individuals facing treatment uncertainty and the lack of knowledge and psychological distress that characterize such a condition (Mattson and Hall, 2011; Nolan et al., 2017). The underlying rationale for suggesting that social support may benefit people facing uncertainty in treatment outcomes derives from the principle that social support allows individuals to better cope and that this enhanced coping will result in improved decision-making (Cassel, 1976; Cobb, 1976; Barrera, 1986; Heitzmann and Kaplan, 1988; Mattson and Hall, 2011; Nolan et al., 2017) and fewer negative psychosocial effects commonly associated with uncertainty, such as stress, emotional distress, anxiety, depression and loss of control (Dean and Davidson, 2018). According to Albrecht and Adelman (1987), social support helps to manage uncertainty by encouraging perspective shifts on cause-effect

contingencies or by enhancing perceptions of control through skill acquisition, tangible assistance, acceptance or assurance, and opportunities for venting.

Researchers have established a distinction between structural and functional aspects of social support. For House and Kahn (1985), structural aspects of social support emphasize the analysis of the structure of support relationships as opposed to the mere existence of their functional content. According to Thoits (1995), structural support refers to the organization of people's ties, the number and frequency of relationships, their social roles and the density and multiplicity of relationships among network members. There is an obvious conceptual parallel between the notion of structural social support advanced by the authors previously cited and the structural dimension of social capital, which deals with the overall patterns of connections that define how actors in a social network interact (Nahapiet and Ghoshal, 1998).

In this chapter we draw on Nahapiet and Ghoshal's (1998) notion of structural social capital and its emphasis on network structure, patterns of interactions and members' roles to evaluate the structure of social support in the OHCs under study. More specifically, the objective of this chapter is to examine the structure of online social support in the two OHCs under study: i) an online forum dedicated to health discussion about e-cigars for tobacco cessation purposes and; ii) a forum centered on the topic of HRT for women experiencing menopause. This section of the study, which is exploratory in nature, examines the network configuration or morphology of these online communities, their patterns of social support interaction and the roles played by individual members in the communities. In so doing, this chapter addresses the following research questions:

RQ6 – What are the relevant morphological properties of the networks of social support in these OHCs facing treatment uncertainty?

RQ7 – What are the patterns of social support interaction in these OHCs facing treatment uncertainty?

RQ8 – How can forum users, in these OHCs facing treatment uncertainty, be segmented into homogeneous groups based on the structural positions they occupy in the networks and their profile of social support interaction?

The chapter proceeds as follows: the next section outlines the research methodology for the study. The following section delivers and discusses the study´s main results. The final sub-section presents the conclusions of the chapter.

6.2. Methodology

This study examines online peer support in contexts of treatment uncertainty using two distinct case studies: an online forum discussing e-cigar health issues (identified as the VAPE forum) and an online forum dedicated to menopausal HRT discussion (identified as the HRT forum). The option for a multiple case study approach, in contrast to a single case study, was based on the principle that the evidence generated from a multiple case studies is stronger and more reliable and allows some control of environmental variation (Eisenhardt, 1989). Moreover, a multiple case study allows contrasting findings from individual cases to identify idiosyncratic and more-prevalent tendencies (Yin, 1994). The two OHCs were selected based on the recognized uncertainty surrounding these therapies (Pisinger, 2015; Schaller and Malhotra, 2015) and the level of member engagement, which included enough messages to provide a robust sample of approximately 200 messages per month.

The unit under analysis is considered messages posted by forum members in two online asynchronous discussion forums. Every forum member in these communities can start a discussion thread, that corresponds to specific topic areas or to questions. Each discussion thread has a title, the identification of its creator, a time and date, and the initial message posted by the thread creator. Forum members join the discussion by posting messages in the thread. Each of these messages includes the user identification, the post time and date, and the content of the message. For the purpose of this study, we extracted the 200 most recent threads in the two forums, available on the 27th of October 2017, using a web scraper (FMiner.com, 2009). These threads correspond to two years of interaction in the VAPE forum and one year and ten months in the HRT forum. The VAPE forum sample was composed of 6.987 unique messages, posted by a total of 997 forum members. The HRT forum sample consisted in 4.739 online messages from 575 forum users.

The rationale behind the choice of this design approach is that each phase attempts to address a specific research question. Specifically, the different phases follow the same order as the RQs (RQ6, RQ7, RQ8).

Phase I

In Phase I, we examined the network morphology of the two OHCs by conducting SNA and comparing the obtained metrics with other OHCs. As noted by Pan et al. (2017), in most OHCs, original posts typically reflect support-seeking efforts, while responses

usually correspond to support provision; therefore, it is possible to generally compare the structure of support provision across different OHCs by focusing on reply ties. We constructed 2-mode networks based on reply-to relationships in which the directions of the edges are from the users who posted the reply message to the users that requested support, by opening a new thread or by soliciting support in an already existing thread. The network analysis involved the production of network visualizations using Gephi, version 0.9.2 (Bastian et al., 2009), the calculation of network measures using UCINET, version 6 (Borgatti et al., 2002), and the production of random networks for comparison purposes using SocNetV (Kalamaras, 2015). For evaluating the scale-free properties of the networks, we used the R programming package poweRlaw 0.70.2. (Gillespie, 2015).

Phase II

In phase II, we applied qualitative content analysis to posted messages to evaluate the patterns of social support interaction. For this purpose, we used the qualitative data analysis software NVivo, version 12 Plus. The coding scheme reflected Cutrona and Suhr's (1992) previously mentioned five main social support categories: informational, esteem, emotional, network and tangible social support. Because in this chapter we were focused on providing a broad overview of the support content in the OHCs under study, we opted to not use Cutrona and Suhr's (1992) second order subcategories of support, an option that has been followed in similar studies (e.g. Coulson, 2005; Hether et al. 2016; Shoham and Heber, 2012). To test intercoder reliability, the researcher and two field experts independently coded a random sample of 10% of threads before the formal coding. The interrater agreement was high among the three; it reached a Cohen's kappa coefficient of 0.88, meaning good agreement (Cohen, 1960; Mchugh, 2012). Discrepancies in codification were solved through discussion until a consensus was reached. Refinement of codes and refinement of the code protocol were then undertaken.

Phase III

To address the eighth research question, in phase III, we carried out a cluster analysis to typify the roles of users in the communities under study. The grouping criteria reflected the structural position of forum users in the networks and respective patterns of social support interaction. Since experimentation and visual inspection are considered a common approach in cluster analysis (Hong et al., 2012), we tested different cluster algorithms, using SPSS, version 24, to find a better grouping of users (hierarchical, k-means and two-step clustering). The final clustering solution was evaluated in terms of external and internal validity.

6.3. Results

To obtain a thorough understanding of the structure of social support interactions in the OHC case studied, this chapter will now focus in the following subsections on the three RQs that guided this stage of the research.

6.3.1. Overall structure of the networks

In this section, we examine the morphological features of the OHCs under study by computing a set of well-established social network metrics used in similar studies (Xu and Zhang, 2016). To draw more-concrete conclusions, we also make a comparison with other OHCs, including a forum dedicated to people who have been clinically diagnosed with depressive disorder, the MDD group (Xu and Zhang, 2016); an OHC for smoking cessation, Quitnet (Cobb et al., 2010); and MedHelp (Vydiswaran et al., 2014), one of the largest and most well-known online forums dedicated to various healthcare-related topics. The results can be observed in Table 16.

The extracted VAPE support network consists of 997 nodes (forum members) and 6668 edges (social support interactions), while the HRT network involves 575 nodes and 4223 edges. Group structure statistics computed for each OHC include the density of the networks of social support. Since the networks are valued, density is calculated as the ratio of the total weight values over the number of all possible edges (Xu and Zhang, 2016). The relative high density of the VAPE and HRT networks was expected, considering their comparatively reduced number of members. Group density and group size are linked both theoretically and mathematically, since larger groups tend to be lower in density (Tulin et al., 2018); as group size increases linearly, the potential number of possible edges increases super-linearly. Thus, to maintain similar levels of density, larger groups on average need to have a much higher number of connections between their group members.

Network diameter is defined as the maximum eccentricity of all the vertices, that is, the largest value of the average shortest path length of all pairs of nodes (Xu and Zhang, 2016). The diameter can be interpreted as the linear size of a network. This measure is important because it sets the context for how close or far the nodes in the network are from each other. The network of the VAPE forum presents a diameter of 11, meaning it takes 11 nodes at most to reach from any node to another. The HRT forum network has a diameter of 12. These values are similar to the ones observed in the other OHCs used for comparison purposes.

Table 16 - Comparison of the VAPE and HRT networks with other OHC networks and random models

Network Measure	VAPE	HRT	Erdös-Rényi model (*)	Erdös-Rényi model (*)	MedHelp	MDD	QuitNet
Type	Directed	Directed	Directed	Directed	Undirected	Directed	Directed
Number of vertices	997	575	997	575	30,915	5,050	7,569
Number of edges	6,668	4,223	6,668	4,223	113,273	36,657	103,592
Time interval of the sample	2 years	1 year and ten months	-	-	19 years	6 years and 5 months	2 months
Network density	0.007	0.013	0.006	0.013	0.000237	0.001438	-
Network diameter	11	12	9	8	-	10	12
Network reciprocity	0.128	0.127	0.004	0.006	-	0.340	0.309
Clustering coefficient	0.084	0.083	0.001	0.013	0.031	0.045	0.173
Average shortest path length	3.95	4.21	3.90	3.40	3.81	4.11	3.32
Power law exponent (in/out)	-/2.48	-/2.31	-	-	2.12	2.13/2.20	1.17/1.24
Min degree (in/out)	0/0	0/0	0/0	0/0	-	0/0	0/0
Max degree (in/out)	356/273	223/278	16/18	19/15	-	451/942	-

(*) The random networks were constructed based on the Erdös-Rényi model and were modeled to replicate the number of vertices and edges of the OHCs under study.
Source: Own elaboration

At the network level, reciprocity refers to the number of ties that are reciprocated in a network (Gest et al., 2011). Both OHCs under study, the VAPE and the HRT networks, present a similar index of reciprocity (ratio of reciprocal ties to all ties), approximately 13%, which is considerably lower than the percentage of reciprocated dyads observed in the other OHCs used for comparison purposes (34% in the MDD forum and 31% in the QuitNet forums). The uncertainty that surrounds these treatment options may accentuate knowledge asymmetries, contributing to such low levels of support mutuality. Reciprocity in kind may be difficult to achieve when information about a certain treatment is uncertain and difficult to access. More experienced forum members can

draw from resources taken from personal or collective experiences and any research studies that exist, while other forum members, who are new to the medication and the online communities, do not have the same level of access to information, limiting their capacity to reciprocate support in the forums.

Network centrality, which can be measured by node degree, is a core concept for characterizing network members' structural position and the potential for influence in the community (Gest et al., 2011). Node degree indicates the number of connections per participant. For directed network graphs, this measure can be decomposed in out-degree (the number of interactions going to other nodes) and in-degree (the number of incoming interactions). In the VAPE forum, 529 forum users (53.06% of total members) had zero in-degree, indicating that a significant portion of forum users in this OHC assumed the single role of support providers without requiring support from the community. Concerning the out-degree, only 111 (11,13%) forum members in the vaping forum presented zero out-degrees, and a very active user presented a maximum of 273 out-degrees. In the HRT forum, 146 nodes (25,39%) had zero in-degrees and 205 (35,65%) nodes had zero out-degrees, whereas the most active support provider in the HRT community had 278 out-degrees.

Considering that in the 3 online communities used for comparison purposes (Medhelp, MDD and QuitNet), the authors concluded that the degree distributions followed a power law, and given that the cumulative distributions of degrees in the VAPE and HRT forums seemed to follow a linear decrease with a heavy tail (Figure 7), we investigated the presence of a power law component (scale-free properties) on the tail of the in- and out-degree distributions (for x greater than some minimum x_m).

A power law distribution implies that the probability of occurrence of an event is extremely skewed, meaning that small observations should occur in large numbers and large observations should occur in small numbers. Following the procedures suggested by Clauset et al. (2007) and implementing on the R poweRlaw package (Gillespie, 2015), we first fitted a power law to the data to estimate the parameters x_m by minimizing the Kolmogorov-Smirnov distance between the data and the power law model. This fitting procedure assumes some lower x_m bound for the empirical reason that most distributions only follow a power law above some x level. After founding the x_m value, we estimated the corresponding α value using its maximum likelihood estimator.

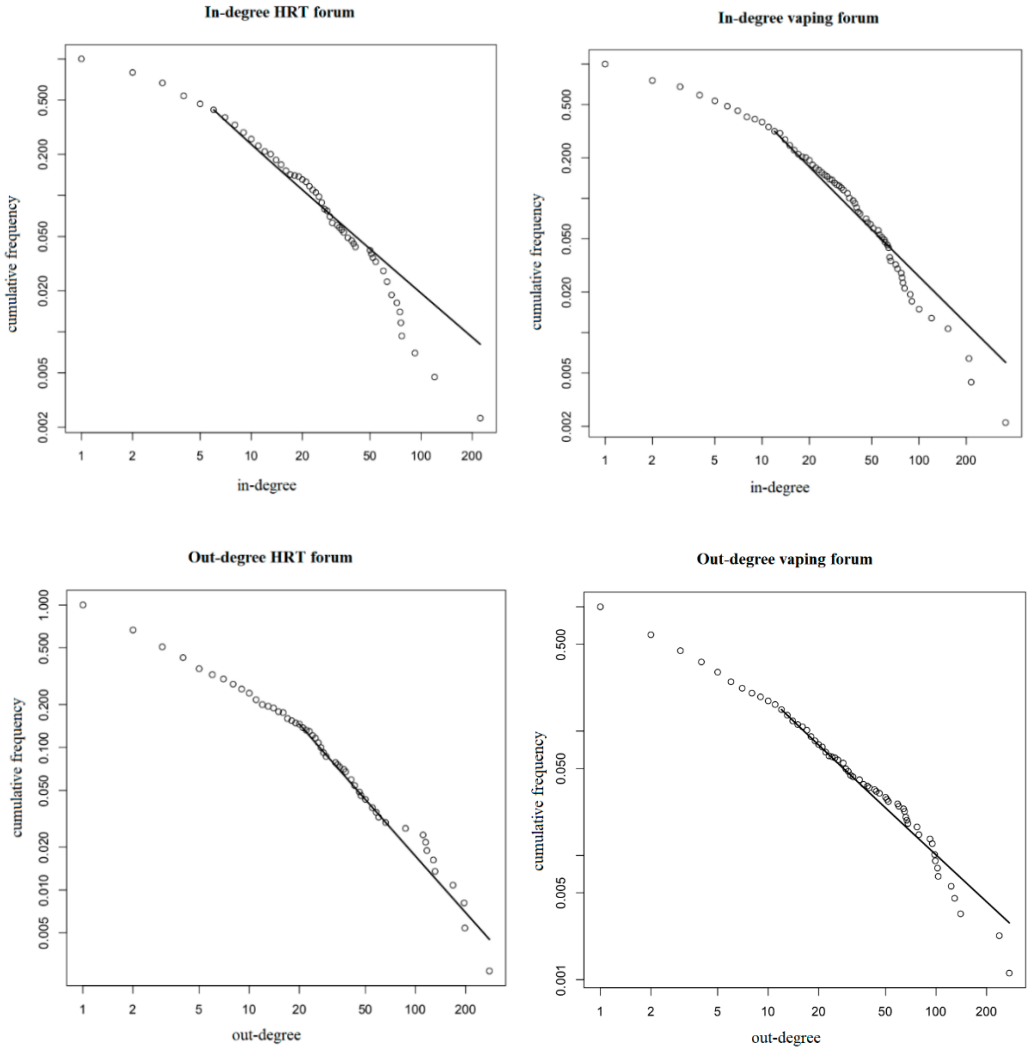

Figure 7 – Cumulative degree distributions and fitted power law on the tail of the distributions, excluding nodes with zero in/out-degrees

Source: Own elaboration

Since it is possible to fit a power law distribution to any dataset, we further tested whether the observed dataset actually followed a power-law via a bootstrapping procedure with 10,000 iterations and the Kolmogorov-Smirnov test to generate a ρ-value for an individual fit. Finally, we used a likelihood ratio test comparison of the power law to other candidate distributions, including the exponential distribution, truncated power law and lognormal distribution, as recommended in the literature (Clauset et al., 2007; Alstott et al., 2014) .

Table 17 – Power law fit results

Dataset	α	std	x_m	std	(ρ)
InVaping	2.16	0.36	12	10.49	0.01
OutVaping	2.48	0.29	12	5.04	0.44
InMenopause	2.07	0.32	6	5.52	0.04
Outmenopause	2.31	0.33	20	7.47	0.48

Source: Own elaboration

The goodness-of-fit test procedure (Table 17) uses the Kolmogorov-Smirnov statistic to test the null hypothesis that the data are generated according to a power law distribution for $x \geq x_m$. Clauset et al. (2007) suggested that the power law is a plausible hypothesis if ρ > 0.1. The computed statistic ruled out the hypothesis of a power law distribution for the in-degree distributions (incoming social support) of both the VAPE and the HRT forums (ρ ≤0.1). Concerning the out-degree distributions (outgoing social support) in both forums, the power law hypothesis was not rejected.

Table 18 – Comparison of power law with alternative candidate distributions

Dataset	Exponential R(ρ)	Truncated Power law R(ρ)	Lognormal R(ρ)
InVaping	15.80 (0.13)	-3.06 (0.01)	-0.25 (0.18)
OutVaping	23.55 (0.00)	-1.03 (0.15)	-0.31 (0.59)
InMenopause	26.25 (0.00)	-3.14 (0.01)	-1.97 (0.22)
Outmenopause	7.56 (0.04)	-0.54 (0.29)	-0.23 (0.61)

Source: Own elaboration

In Table 18, the test statistic, R, is the log-likelihood ratio of the data between the two candidate distributions. The null hypothesis is that both classes of distribution are equally far from the true distribution. This statistic is positive when the data are more likely to follow a power law and negative if the data are more likely to follow the alternative distribution. The significance value for that direction is ρ. Based on the statistics computed, it is possible to conclude from the outdegree distributions (outgoing social support) of both the VAPE and the HRT that moderate support for a power law exists, since neither of the alternative distributions (exponential, lognormal or truncated power law) presents a significantly stronger fit (ρ > .05).

In addition to scale-free properties, authors have found that OHCs can exhibit small-world characteristics (Vydiswaran et al., 2014; Xu and Zhang, 2016) as described by Watts and Strogatz (1998). Small-world networks are characterized by highly clustered topologies with short path-lengths (Watts and Strogatz, 1998). We examined the community structure of the networks under study to see whether they displayed small

world characteristics, by comparing their average path lengths and clustering coefficients with ad-hoc model-generated random networks. A network with n nodes and m edges is a small-world network if it has a similar path length but greater clustering of nodes than an equivalent Erdös-Rényi random network with the same n and m (Humphries and Gurney, 2008). As shown in Table 16 above, we found that both OHCs under study exhibit similar average path lengths as the random models and clustering coefficients were significantly higher than the coefficients would be by random chance; thus, we conclude we have a positive verification of small-world properties in both OHCs.

6.3.2. Patterns of social support interaction

The analysis of the patterns of interaction indicates that informational social support is the most frequent type of social support requested and provided in both OHCs. Tangible and network types of social support were found to be less frequent. As Table 19 shows, an overwhelming majority of messages sought informational support (97% in the HRT forum; 94% in the VAPE forum). The second-most-requested typology of social support in both samples was esteem support (2% in the HRT forum; 6% in the VAPE forum), followed by emotional types of support (1% in the HRT forum; 0,3% in the VAPE forum). Similar to support requests, a majority of support provision messages were of informational support (79% in the HRT forum; 84% in the VAPE forum). In both samples, emotional and esteem support were not commonly requested by forum members. However, we detected diverse instances in which community members provided unsolicited emotional or esteem support.

Table 19 – Nonparametric chi-square analyses comparing the frequency of social support dimensions in the VAPE and HRT samples

	HRT forum		VAPE Forum	
	Requested	Provided	Requested	Provided
Support Type				
Informational support	499a	3323 a	229a	5631a
Esteem support	10b	226b	19b	664b
Emotional support	6c	659c	1c	322c
Network support	0	15d	0	45d
Tangible assistance	1c	0	0	6e

Values in the same column with different letter superscripts are significantly different from one another at the level of at least $\rho < .05$.
Source: Own elaboration

Nonparametric chi-square tests confirmed significant differences among informational types of support and the other categories of social support in the two samples. In the HRT forum, significantly more messages requested informational support than esteem

($\chi^2_{(1)} = 469.786;\ \rho < .000$), emotional ($\chi^2_{(1)} = 481.285;\ \rho < .000$) or tangible forms of support ($\chi^2_{(1)} = 496.008;\ \rho < .000$). A similar conclusion was reached for the VAPE forum, in which forum members requested significantly more informational support than esteem ($\chi^2_{(1)} = 177.823;\ \rho < .000$) or emotional support ($\chi^2_{(1)} = 226.017;\ \rho < .000$). In the support-providing interactions, we also found significant differences in the frequency of each support typology, with informational support being provided significantly more than any other category of social support in both OHCs.

6.3.3. Exploring the roles of members in the networks

To typify the role of users in the OHCs under study, we carried out a cluster analysis. The selected clustering variables reflect both the structural position of members in the networks and members' patterns of social support interaction. Next, we present the rationale for selecting each cluster variable.

Bridging Social Capital

The small-world properties of the OHCs under study imply that these communities are highly clustered. Nodes that bridge different clusters provide shortcuts that allow informational support to hop from cluster to cluster. The nodes (brokers) that bridge informational support between otherwise unconnected members also occupy a strategic position in the networks, providing what Putnam (2000) identifies as bridging social capital. Their position in the networks can also be understood from the perspective of structural hole theory, proposed by Burt (1992). Structural holes occur in a network when egos' contacts are indirectly connected through ego but do not have direct ties themselves. Following previous studies of online social capital (Pan et al., 2017), this research measured members bridging social capital as network betweenness, which measures the extent to which a vertex falls on the geodesic paths (shortest paths) between other pairs of nodes in the network and can be computed by the following formula (Freeman, 1978):

$$b\ (v) = \sum_{s \neq v \neq t} \frac{\sigma_{st}(v)}{\sigma_{st}} \quad (1)$$

where $b\ (v)$ represents the betweenness centrality of vertex v, σ_{st} is the total number of shortest paths from node s to node t, and $\sigma_{st}(v)$ is the number of those paths that pass through v.

Bonding Social Capital

While bridging social capital brings together a variety of different network members, by linking isolated subcommunities, bonding social capital reflects the connection that occurs between closely tied members of the community, fostering the building of trust and cooperative relations among network members (Burt, 2001; Murayama et al., 2012). In contrast to bridging capital's inclusiveness and diverseness, bonding capital is exclusive because it is based on close relationships. Bonding social capital can be measured structurally as network constraint (Pan et al., 2017), which is a metric of closure that evaluates the interconnectivity, or relationship redundancy, of the sub-network surrounding an actor (Ganley and Lampe, 2009). Ego´s constraint was calculated as the following (Burt, 1992):

$$C_{(ij)} = (p_{ij} + \sum_q p_{iq}p_{qj})^2, q \neq i,j \qquad (2)$$

where p_{ij} is the proportion of ego i's resources invested in the connection with j, and $p_{qj}$is the strength of q´s tie to j. The sum of the dyadic constraints of all relations of a node constitutes the aggregated constraint on that node (Burt, 1992).

Hubness

In section 6.3.1., we identified moderate support of a power law in the out-degree distributions of both OHCs. The verification of a power law distribution for the out-degree frequency implies that highly connected hubs directly link to many poorly connected nodes, through social support provision. The provision of support from highly connected users (at a higher level of the forums' social hierarchy) to poorly connected users can be interpreted structurally as an illustration of linking social capital, in which the vertical ties established between users provide access to social support resources. The "hubness" of each network member was evaluated based on the respective out-degree

(number of outgoing social support interactions) and in-degree (number of incoming social support interactions).

Profiles of social support interaction

The profiles of social support interaction for each forum member were operationalized in the clustering model by a 1x6 vector where each component of the vector represents the member´s percentage of messages categorized in the most relevant categories of social support (informational, emotional and esteem social support). For example, if a certain node received 10 instances of informational support, provided 50 instances of informational support, received 5 instances of esteem support, provided 10 instances of esteem support, received 5 instances of emotional support and provided 20 instances of emotional support, his vector can be represented by < 0.1, 0.50, 0.05, 0.1, 0.05, 0.2>. We opted to exclude network and tangible forms of support of the cluster analysis due to their low frequency in both OHCs.

To evaluate the role of each member in the community, we first build a profile for each user by aggregating her/his hubness, bridging social capital, bonding social capital, and pattern of social support interaction measured by the metrics described above. We excluded from the analysis one outlier in the VAPE forum and eight outliers in the HRT forum whose patterns of social interaction only included network or tangible types of support, which were found to be least relevant dimensions in the OHCs. Working with standardized variables, we then tested different cluster algorithms to find a better grouping of users (hierarchical, k-means and two-step clustering). Using the loglikelihood distance measure and the Schwarz's Bayesian criterion, the SPSS two-step clustering procedure provided an automated 4-cluster solution with similar meaning in terms of the interpretation of the clusters in both OHCs, which could be explained in light of existing theory (external validity), while also providing a solution with strong internal validity.

The internal validity of the 4-cluster solution was accessed by following the methodology suggested in Norusis (2008). First, model fit was evaluated by the silhouette measure of cohesion and separation. The obtained value of 0.5 (in both samples) is considered "good", indicating validity of the within- and between-cluster distances. Second, Kruskal-Wallis tests confirmed statistically significant differences ($\rho < 0.001$) between the clusters' mean ranks in relation to all the cluster variables. The option for a nonparametric test was based on the verification of non-normality and heteroscedasticity of the variable distributions in the various clusters. Finally, as

suggested by Norusis (2008), the cluster solution was further assessed by splitting the dataset into random halves and running the same clustering procedures. The obtained results for each halved sample were similar in terms of the characteristics of the clusters and goodness of fit, reconfirming the robustness of the 4-cluster solution.

In Table 20, we present the characteristics of the found segments in terms of each segmentation variable and the results of the tests verifying the differences. We opted to present the mean ranks of the factor variables to provide a sense of the extent to which the groups score differently on the various clustering variables. Considering that the distributions were skewed and presented different shapes, measures of central tendency, such as the median, offered reduced interpretation power. Dunn's post hoc pairwise comparison tests were also carried out on each pair of groups for all the clustering variables.

The first cluster, labeled *knowledge seekers*, is composed of forum members who mostly search the online forums for informational types of support. Several studies on uncertainty management have reported evidence that information seeking is an integral strategy used to manage health-related uncertainty (e.g. Brashers et al., 2004; Dillard and Carson, 2005; Donovan-Kicken and Bute, 2008; Goutzamanis et al., 2018). Members in this segment are also characterized by high scores of in-degree and reduced out-degree centralities. Curiously, this cluster includes most forum users in the HRT forum (54% of the users) but only ranks third in order of importance in the VAPE forum (21% of forum users).

The second cluster, named *knowledge providers*, is composed of users who mostly access the communities to provide informational support. These users tend to present more out-degree than in-degree connections, meaning they are generally more focused on providing than receiving social support. They constitute the second-most-populated segment in the HRT forum (32% of users) and the most populated segment in the VAPE forum (47% of users).

The third cluster, named *community builders*, describes the subgroup of users with the highest scores of bonding social capital. This segment includes the users who provide the highest relative proportions of emotional and esteem social support in terms of individual interaction patterns. They constitute the second-most-populated segment in the VAPE forum (26% of the users) and the third in the HRT forum (10% of the users).

Table 20 – Factor mean ranks and statistical tests verifying the differences in the clusters

Measures	Mean ranks				*P* value*	Pairwise comparison**					
	Knowledge seekers (WS)	Knowledge providers (WP)	Community builders (CB)	Influencers (I)		WS:CB	WS:WP	WS:I	CB:WP	CB:I	WP:I
VAPE OHC											
n	208	469	259	60							
Out-degree	363.92	485.79	518.98	661.07	<.001	<.001	<.001	.001	*.998*	.002	<.001
In-degree	619.72	308.93	307.63	827.38	<.001	<.001	<.001	.002	*1.000*	<.001	<.001
Bonding SC	569.92	347.05	688.08	583.32	<.001	<.001	<.001	*1.000*	<.001	.017	<.001
Bridging SC	396.85	513.88	547.36	682.14	<.001	<.001	<.001	<.001	*.275*	.013	<.001
Provided Info	173.75	747.43	244.04	367.49	<.001	*.492*	<.001	<.001	<.001	.011	<.001
Received Info	887.28	322.94	501.36	510.68	<.001	<.001	<.001	<.001	<.001	*1.000*	<.001
Provided Estee	468.50	418.48	650.91	570.08	<.001	<.001	.021	.004	<.001	.036	<.001
Received Estee	513.43	437.25	533.58	774.06	<.001	*1.000*	<.001	<.001	<.001	<.001	<.001
Provided Emot	448.85	449.98	603.12	501.26	<.001	<.001	*1.000*	*1.000*	<.001	<.001	*1.000*
Received Emot	542.66	467.14	479.44	672.83	<.001	<.001	<.001	<.001	*1.000*	<.001	<.001
HRT OHC											
n	307	181	56	23							
Out-degree	210.51	377.10	284.33	531.48	<.001	.009	<.001	<.001	.001	<.001	<.001
In-degree	350.18	174.99	169.38	537.59	<.001	<.001	<.001	<.001	*1.000*	<.001	<.001
Bonding SC	239.43	228.87	328.44	233.13	<.001	<.001	*1.000*	*1.000*	<.001	<.001	*1.000*
Bridging SC	277.20	277.27	238.06	539.54	<.001	*.322*	*1.000*	<.001	*.398*	<.001	<.001
Provided Info	189.23	470.93	172.33	349.74	<.001	*1.000*	<.001	<.001	<.001	<.001	.003
Received Info	389.51	156.41	124.06	269.13	<.001	<.001	<.001	<.001	*1.000*	.001	.008
Provided Estee	267.05	267.11	465.28	357.04	<.001	<.001	*1.000*	<.001	<.001	<.001	<.001
Received Estee	264.89	275.55	361.85	416.04	<.001	<.001	*1.000*	<.001	<.001	*.154*	<.001
Provided Emot	251.75	288.21	465.91	372.47	<.001	<.001	.006	<.001	<.001	<.001	<.001
Received Emot	311.44	239.88	221.55	416.98	<.001	<.001	<.001	.001	*1.000*	<.001	<.001

(*) Listed are the P values for the Kruskal-Wallis test.

(**) Indicated are the Dunn's post hoc Bonferroni adjusted comparison P values. Highlighted in italics are the P values that do not reach statistical significance (ρ > .050)

Source: Own elaboration

Finally, the fourth and smallest cluster in both OHCs (6% of users in the VAPE forum and 4% in the HRT forum) generally includes the nodes with the highest scores of degree centrality and who also rank the highest in bridging social capital. We opted to name this cluster the *influencers*. Highly centralized hubs, with their high in- and out-degree centralities, enjoy a preponderance of power and influence through their central position in the networks, which allows them to shape the flow of support resources in the network (Kenney et al., 2017). In addition, the high scores of bridging social capital reveal that these hubs can also serve as bridges between different subcommunities. This cluster also includes some users with reduced degree centralities and high betweenness. A bridge is not necessarily a hub, because a node that connects two clusters may have only two links, one to each cluster (Kenney et al., 2017). For example, the VAPE forum includes a node, classified in this cluster, with a high score on bridging social capital (betweenness centrality of 1085), two out-degree connections and one in-degree link. Despite the reduced number of direct connections, egos with high betweenness centrality are capable of decisively influencing communities by linking isolated groups and are exposed to nonredundant information and resources from the direct contacts they establish across subcommunities (Pan et al. 2017). The number of egos with reduced degree centrality and high betweenness is very small (only two users in the VAPE forum and one in the HRT forum).

Figures 8 and 9 provide a graphical representation of the networks of social support interactions. In these graphs, which were constructed with the software Gephi 0.9.2. (Bastian et al., 2009), nodes represent users, and edges reflect occurring support interactions. To reflect members' hubness, node size is proportional to members' degree centrality and, to better visualize the nodes that act as brokers, node density in certain areas of the graphs reflects network subcommunities, which are highlighted in different colors. Subcommunity detection was based on the Louvain method (Blondel et al., 2008), a greedy heuristic method that recurses to modularity optimization by measuring the relative density of edges inside sub-communities with respect to edges outside these sub-communities.

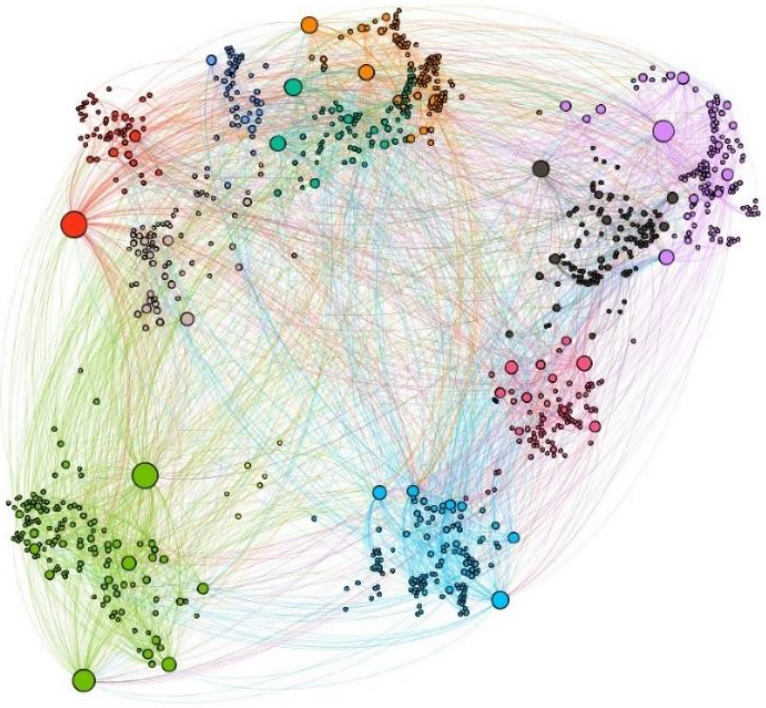

Figure 8 – Sociogram - network visualization of social support interactions in the VAPE forum
Source: Own elaboration

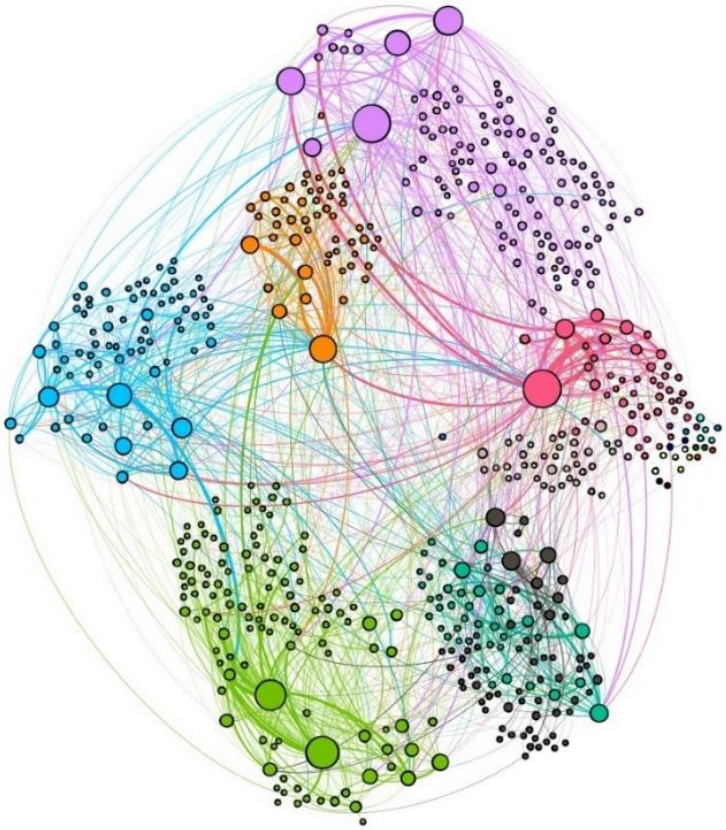

Figure 9– Sociogram - network visualization of social support interactions in the HRT forum
Source: Own elaboration

6.4. Discussion

For any marketing program to be successful marketers need to identify and emphasize the benefits of the product most appealing to the consumers (Grier and Bryant, 2005). Optimal matching theory (Cutrona, 1990; Cutrona and Russell, 1990) posits that certain types of social support are more suitable to cope with specific kinds of stressful events. The theory assumes that the benefits and the deleterious effects of social support are due to the matching, or mismatching, of support in different contexts and situations (Merluzzi et al., 2016). To capture new forum members, social marketeers need to develop and promote a social support product that corresponds to the needs of individuals experiencing treatment uncertainty. The analysis of the patterns of social support interaction reveal that informational support is the most frequently requested category of social support in both OHCs. This result suggests that individuals mostly participate in these OHCs for knowledge acquisition purposes. Various studies applying uncertainty management theory have reported evidence that information seeking is an integral strategy used to manage health-related uncertainty (e.g. Brashers et al., 2004; Dillard and Carson, 2005; Donovan-Kicken and Bute, 2008; Goutzamanis et al., 2018). Theoretical frameworks such as selective exposure (Zillmann and Bryant, 1985), channel complementarity (Dutta-Bergman, 2010) and the risk perception attitude framework (Rimal and Real, 2006) all recognize that in contexts of uncertainty, individuals search for information that meets their needs.

Compared with other OHCs, the online communities under study are characterized by having comparatively smaller indices of reciprocity. While some forum users mostly search for information in these OHCs (knowledge seekers), other actors have the knowledge and the confidence, or sense of self-efficacy, to present themselves to the communities as advisors or experts (knowledge providers). Careful attention should be given to the segment of information providers. It is important to recognize that some knowledge providers are strong defenders of these uncertain treatments; thus they may be selective in the information they transmit, and their biases may resonate, leading them to create a negative social support environment in which open and objective discussion is no longer possible. OHCs should be places for open discussion about the health benefits and risks of these treatment options and not echo chambers for those who strongly believe in the benefits of such therapies. To overcome this problem, social marketing can focus on fostering social support reciprocity. Reciprocity contributes to the development of community cohesion (Putnam, 2000), reinforces cooperative behavior (Lee et al., 2010), and is considered a key defining attribute of social support (Hupcey, 1998; Finfgeld-Connett, 2005). Social marketing actions can target the

segment of older and more active knowledge seekers, meaning users that post many questions in the OHCs, and try to sensitize these actors to the importance of increasing their contribution to the communities by also providing support to other members. However, it is important to consider that reciprocity intentions may be influenced by individuals' perceptions of self-efficacy, social support skills and perceived costs of reciprocity. Forcing people to reciprocate support may place the recipients in an uncomfortable state of tension due to the feelings of indebtedness; to reduce this discomfort, people may simply refuse to accept more support, even though they continue to need it (Shumaker and Brownell, 1984).

For certain core members whose structural position in the network confers on them the capacity to influence other users (the influencers), social marketing objectives may consist of reinforcing the predisposition of key users to foster their participation while also contributing to minimize the potential negative consequences of support interaction. The literature identifies some of the potential negative consequences of support interaction, including disappointment, moral obligations to accept or reciprocate assistance, relational conflicts, stress, embarrassment, envy, invasion of privacy, disputes and social aggression (Rook, 1984; Eckenrode and Gore, 1981; Lincoln, 2000; Brashers et al., 2004). As a result of their structural network position, the influencers have a strategic advantage in terms of their ability to shape the processes of support interaction in the online communities. In this respect, the small world and scale-free properties found in these OHCs have relevant consequences for marketing segmentation and targeting. The scale-free properties verified in the outdegree distributions of both OHCs indicate that most forum members provide little support, while a small number of highly centralized members (hubs) strongly contribute to support provision. Scale-free networks are shown to be resilient to random edge and node failures, but they are considerably sensitive to hub-targeted actions (Ayvaz et al., 2018). Considering this point, it is recommended that behavior change marketing efforts designed to minimize the negative consequences of support interaction should focus mainly on the segment of highly connected central hubs. The central position that these members occupy in the OHCs confers on them a strategic advantage not only in terms of access to relevant information but also in their ability to influence other members´ behaviors (Kumi and Sabherwal, 2018). In addition, the small-world properties of these networks indicate that social marketing actions should also focus on the "network brokers". These actors bring together disconnected segments of a network by having ties with members who are not otherwise connected to each other (Gest et al., 2011). Their power in the network can also be negatively interpreted in terms of the potential that

they wield to distort what is passed along to serve the actor's interests or personal beliefs. The absence of some connections in the networks creates relational holes that provide brokers with opportunities to mediate the flow of information among members and, therefore, control and influence others (Aeby et al., 2014). Furthermore, and as highlighted by Carron-Arthur et al. (2015), knowing who the most influential users are in OHCs, or how to reach most of the community through the smallest subset of users, might inform dissemination activities such as promoting new evidence about these uncertain treatments or recommending correct use of these therapies.

Finally, the role of community builders should not be overlooked, as they bring a sense of community, contributing to cooperative relations, trust, and network building. In addition, these members also contribute to disseminate subjective norms and moral obligations and can influence communities' collective narratives and understandings (Aeby et al., 2014). Behavioral economics and psychology highlight the dominance of heuristics compared with rational weighing strategies under conditions of limited knowledge and uncertainty (Zinn, 2009). In such conditions, instead of applying logical or rational thinking strategies to problem solving, people tend to rely more on heuristic-based modes of information processing (mental shortcuts that ease the cognitive load) and on subjective cues for judgment, such as the emotional and affective responses they are receiving from other members of the community (Schaller and Malhotra, 2015). In other words, under conditions of limited knowledge and uncertainty, emotional and esteem support from other network members can facilitate message acceptance.

6.5. Final remarks

This study contributes to a deeper understanding of online social support by analyzing the structure of social support interactions in two OHCs were members face high uncertainty in treatment outcomes. Next, a summary of the chapter's main conclusions, in relation to each research question, is presented.

Concerning RQ6, it was possible to conclude that the two online forums share a common structural signature, characterized by i) scale-free properties, which were confirmed by the verification of a power law in the distributions of outgoing social support; ii) small-world properties, implying that the networks of social support interaction are highly clustered and have smaller average path-lengths than random networks; and iii) reduced indexes of dyad network reciprocity, meaning limited reciprocal social support provision.

In relation to RQ7, it was found that informational support is the most frequently requested (and provided) category of social support in both OHCs. Emotional and esteem types of social support are not commonly requested by forum members. However, there are circumstances in which community members provide unsolicited emotional or esteem types of support. Emotional support is mainly provided in the form of sympathy, understanding and encouragement, while esteem support mostly assumes the form of validation and compliments. Tangible and network types of support were found to be the less frequent categories of requested social support.

Regarding RQ8, the results of the cluster analysis suggest that there may be patterns in how people participate in OHCs facing treatment uncertainty. Using multiple metrics that reflected the structural position of actors in the network and their profile of social support interaction, it was possible to define a categorization scheme applicable to both OHCs under study. The first cluster, named knowledge seekers, is composed of forum members who mostly search the online forums for informational types of social support. The second cluster contains the knowledge providers, meaning users that mostly contribute to the communities by providing informational social support. The third cluster, named community builders, describes the segment of users with the highest scores of bonding social capital and who provide the highest relative proportions of emotional and esteem types of social support. The fourth and smallest cluster in both OHCs includes the more central actors (highest scores of degree centrality), who also rank the highest in bridging social capital (brokers). We opted to name this cluster the influencers.

Results obtained by this study can inform the design of personalized and targeted interventions that promote online social support while also setting the stage to minimize the potential negative consequences of social support interaction. Different types of social marketing interventions can be designed to enhance online peer social support. First, interventions can focus on leading people to join the online communities. The purpose here is to create or scale up social aggregates composed of people who face the same stressful predicaments due to treatment outcome uncertainties. Second, interventions can aim to optimize the quality of social support that is available in these OHCs. In general, leading people to exchange online peer social support that is conductive to positive health outcomes can be defined as the behavioral change objective of social marketing programs targeting individuals facing treatment uncertainty. By emphasizing the need to pursue positive health outcomes, it is implicitly that online social support interactions in these OHCs can also have harmful impacts on health and well-being. Social marketing intervention design can be strengthened through the

explicit consideration of these potentially negative effects of support interaction that compete with the desired positive health outcomes.

We suggest that social marketeers should recognize the different roles that users play in these OHCs and, on ethical grounds, define suitable marketing strategies for each relevant segment with the objective of improving the quality of social support interactions. Although there is an ongoing debate about the ethics associated with the segmentation process, what remains evident is that segmentation can increase the efficiency and effectiveness of social marketing efforts (Schuster et al., 2015). To increase social support reciprocity, we suggest that social marketers target the segment of the older and most active knowledge seekers; these users, due to their experience in the forums and the knowledge they are able to accumulate, may be in a better position to evolve in their contribution and assume the most demanding role of support providers. To minimize some of the potential negative aspects of social support, including relational conflicts, disputes, social aggression and the effects of members' biases in the quality of the information provided in the forums, social marketers can focus on the segment of the influencers, since these key forum users have a strategic advantage in terms of their ability to shape the processes of support interaction. Finally, community builders are an important segment to consider when the intention is to pass a convincing marketing message because these actors, with their high bonding social capital, are able to construct closer and stronger social relationships with other forum users and tend to be the most socially skilled and trustworthy members in the OHCs.

Chapter 7 – General conclusions

7.1 Introduction

This final chapter of the thesis is organized into five distinct sub-sections. After this introductory section, a summary of the study´s main conclusions is presented, covering each research objective, and answering the research questions indicated in chapter 1. Then, the contribution of the study to social marketing practice is emphasized, as well as the contribution of the study to academia. The chapter concludes with a discussion about the limitations of the study and suggestions for future research inquiry, including topics that were not sufficiently explored in this study and other research opportunities that remain open.

7.2 Main conclusions

This research was set on the field of social marketing and health studies and made use of social capital theory to investigate online social support interactions in OHCs where users face treatment uncertainty. The main aim of the study was to explain the nature of occurring support interactions in such online forums and to advance some guiding principles for social marketing interventions aimed at promoting online social support or enhancing the quality of support available in OHCs where users are subject to treatment uncertainty. To attain this aim, the study adopted a hybrid method, involving both the use of deductive and inductive approaches (Fereday and Muir-Cochrane, 2006). The methodology was rooted on critical realist paradigm, which was appropriate to disentangle the intricate nature of social support interactions within real contexts of treatment uncertainty, and made use of a mixed methods approach, involving an initial scoping review, followed by a netnographic study and quantitative study involving SNA.

This section describes the study's conclusions in relation to each research objective and corresponding research questions, which are recapitulated in Table 21.

Table 21 - Summary of objectives and research questions

Research Objectives	Research Questions
Essay I: Uncovering the use of the social support concept in social marketing interventions for health	
#1. To provide an account as to how the social support concept is being operationalized in social marketing interventions in the health area	RQ1: How have practitioners operationalized the use of the social support concept in health-related social marketing interventions?
#2. To describe which theories or conceptual models were applied in social marketing interventions in the health area to justify the operationalization of the social support concept	RQ2: What is the theoretical reasoning provided by practitioners for using the concept of social support in health-related social marketing interventions?
Essay II: Examining social capital and online social support links in online health communities facing treatment uncertainty	
#3. To understand how structural social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty	RQ3: How does the structural dimension of social capital, reflected in the patterns of connections between users, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?
#4. To understand how relational social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty	RQ4: How does the relational dimension of social capital, expressed by reciprocity, trusting relationships, groups' norms, obligations and social identification, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?
#5. To understand how cognitive social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty	RQ5: How does the cognitive dimension of social capital, including shared language, codes and accepted narratives among parties, influence the conditions for social support exchange in these OHCs where users face treatment uncertainty?
Essay III: Online social support structure in contexts of treatment uncertainty	
#6. To understand the structure of online social support and the morphological properties of the support networks in these OHCs where users face treatment uncertainty	RQ6 – What are the relevant morphological properties of the networks of social support in these OHCs facing treatment uncertainty?
#7. To identify the patterns of social support interaction in these OHCs facing treatment uncertainty	RQ7 – What are the patterns of social support interaction in these OHCs facing treatment uncertainty?
#8. To typify the specific roles fulfilled by users in these OHCs facing treatment uncertainty and to provide a methodology to identify active and influential users	RQ8 – How can forum users, in these OHCs facing treatment uncertainty, be segmented into homogeneous groups based on the structural positions they occupy in the networks and their profile of social support interaction?

7.2.1. Research Objectives #1 and #2

The first two objectives of this investigation were attained through Essay I, which involved a scoping review of social marketing interventions in the health field. The first research objective aimed specifically "to provide an account as to how the social support concept is being operationalized in social marketing interventions in the health area". The scoping review evaluated how the social support concept was operationalized in social marketing interventions in relation to each of the social marketing benchmarks defined by Andreasen´s (2002). It was concluded that while there were a few rigorous high-profile interventions that explored the concept in an integrated manner, such as the Madres para la Salud programme (Keller et al., 2012), most interventions have approached the concept from a somewhat simplistic perspective, by integrating a disconnected social support component in the programs. Nevertheless, it was possible to observe examples of the operationalization of social support within all the key social marketing benchmarks, including: behavioral change (stimulating social support was identified as the main objective of some interventions, requiring behavioral change from both the providers and the receivers of social support), consumer research (some interventions applied formative research to access social support necessities and existing networks), segmentation and targeting (applied in the programs to select and prioritize meaningful population segments to receive social support and to select social support providers), the principle of exchange (social support was identified in some interventions as a relevant benefit for the core targets, and it was provided in exchange behavior change attempts), the marketing mix (some interventions discussed the concept in relation with the traditional four P´s of marketing) and competition (included the identification of social support barriers and the potential deleterious effects of social support in behavioral change).

The scoping review also served to attain the second research objective, which was "to describe which theories or conceptual models were applied in social marketing interventions in the health area to justify the operationalization of the social support concept". It was concluded that in most interventions social support was poorly conceptualized. The results indicated that social support was rarely defined in the analyzed articles, that interventions did not explicitly referred to a social support theoretical framework and none comprehensively established the theoretical rationale to operationalize the social support concept.

7.2.2. Research Objectives #3, #4 and #5

The third, fourth and fifth research objectives were achieved through Essay II, involving the netnographic study, which allowed the authors to emerge in the subculture of both OHCs, and to study social support interactive processes and characteristics of collective behaviors in connection with Nahapiet and Ghoshal's (1998) dimensions of structural, relational and cognitive social capital.

Research objective #3 aimed "to understand how structural social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty". To fulfill this objective the research qualitatively analyzed the patterns of social support linkages in the OHC's case studied. It was concluded that members of both OHCs mostly search for informational support, more specifically self-disclosure and teaching forms of informational support and it was inferred that while self-disclosure can be interpreted structurally as bridging social capital, teaching social support reflected linking social capital ties. Emotional and esteem forms of social support were interpreted structurally as evidence of bonding social capital and it was observed that in most cases the provision of these forms of social support was unsolicited. Finally, network forms of social support, which provided access to community resources such as forum guidance were found to be unidirectional, involving mainly support provision from experienced community members to new members and, as such, it was interpreted structurally as an illustration of linking social capital.

In relation to research objective #4, it was intended "to understand how relational social capital influences the conditions for social support exchange in these OHCs where users face treatment uncertainty". This objective was achieved by analyzing social support reciprocity, trusting relationships, groups' norms, obligations, and social identification within the OHCs. It was found that despite the reduced levels of dyad reciprocity in social support, there is a perception of generalized reciprocity in the forums. It was also found that members of the OHCs are guided by formal and informal community norms when they social interact in the forums, and that members need to enact these norms if they want to be integrated within the communities. It was also concluded that, despite the limitations imposed by the online environment, members' interpersonal trust in others' expertise and integrity can occur and that bonding social capital, through emotional and esteem support, can contribute to trust development. Finally, it was concluded that the existence of multiple sub-communities, with specific consumption interests in these uncertain treatments, could complicate social support interactions in the forums.

Research objective #5 aimed to understand how "cognitive social capital influences the conditions for social support exchange in the OHCs. This objective was attained by analyzing those community resources that provide shared representations, interpretations, and systems of meaning among parties, including language, codes and accepted narratives. First, it was found that network forms of social support facilitate processes of language assimilation in the OHCs through linking social capital. Second, it was detected a system of codes in the OHCs that signals hierarchy, status, and the credibility of community members. Third, the analysis of common discourses in the forums revealed that online discussion is conformed to suit the forums' shared and accepted narratives emphasizing the benefits of these uncertain treatments, while minimizing the respective risks, and that there is a general negative perception of forum users towards the formal healthcare system.

7.2.3. Research Objectives #6, #7 and #8

To attain research objectives #7, #8 and #9, the research analyzed the structure of social support interactions in the two OHCs predominantly using the SNA technique.

Research objective #6 aimed "to understand the structure of online social support and the morphological properties of the support networks in these OHCs where users face treatment uncertainty". This research objective was achieved by computing a set of well-established social network metrics and making a comparison with other OHCs. It was concluded that the two online forums share a common structural signature, characterized by scale-free and small-world properties and reduced indexes of dyad network reciprocity.

Research objective #7 consisted in the identification of the "patterns of social support interaction in these OHCs facing treatment uncertainty". The general patterns of social support interactions were evaluated based on Cutrona and Suhr's (1992) SSBC scheme, by focusing on the main five basic typologies of social support: informational, emotional, esteem, network and tangible support. Nonparametric chi-square tests were applied to test for significant differences among the various types of social support. This quantitative analysis confirmed informational support as the most frequently requested (and provided) category of social support in both OHCs, with chi-square tests confirming significant differences among informational types of support and the other categories of social support in the two samples.

Research objective #8 aimed "to typify the specific roles fulfilled by users in these OHCs facing treatment uncertainty and to provide a methodology to identify active and influential users". This research goal was achieved through a cluster analysis using variables that reflected both the structural position of actors in the network and their profile of social support interaction. The cluster analysis provided a categorization scheme applicable to both OHCs under study consisting in four segments: the first cluster, labeled "knowledge seekers", is composed by forum users that mostly search the OHCs for informational types of social support. The second cluster contains the "knowledge providers", meaning users that mainly contribute to the OHCs by providing informational types of social support. The third cluster, named "community builders", describes the segment of users with the highest scores of bonding social capital and who provide the highest relative proportions of emotional and esteem types of social support. The fourth and smallest cluster in both OHCs includes the "influencers", which comprises the more central actors (highest scores of degree centrality), who also rank the highest in bridging social capital.

7.3 Practical implications

In terms of contribution to practice, the results of this thesis provide significant insights for public policy decision makers, private and non-for-profit health promotion organisms, managers of the OHCs and intervention developers, that can be used to program future community-based social marketing interventions intended to improve the quantity and quality of social support available in OHCs where users may be subject to treatment uncertainty. From an intervention point of view, the findings of this thesis can also serve in the development and design of tailored OHC systems that better harness the benefits of support provision for people facing treatment uncertainty, while setting the stage to minimize the potential negative aspects of online support provision. Next, we summarize some of the most relevant conclusions of this research for social marketing practitioners.

First, this research presents a scoping review of social marketing interventions in the health area that operationalize the social support concept. From this review it was possible to identify some fragilities that deserve careful attention in future interventions: i) most social marketing interventions reviewed fail to provide a precise definition of social support and do not clearly report the theoretical rationale to integrate a social support component in the projects; ii) the majority of interventions lack a social support outcome measurement element; iii) no intervention acted upon the receivers of social support by reinforcing social support skills or the predisposition of individuals to receive

social support; interventions simply assume that all targeted individuals are capable to take advantage of support provision and are willing to engage in support interactions; iv) formative research prior to intervention was limited in the reviewed interventions and mostly focused on the evaluation of social support necessities and existing support networks, with not intervention reporting the application of formative research to identify social support barriers, targets' required typologies of social support and preferred sources of support. From the cited gaps, especially relevant is the lack of a sound theoretical background in the reviewed interventions to justify the operationalization of the social support concept. The use of theory to inform field interventions is currently recognized as an important component of social marketing (French and Blair-Stevens, 2005), as theory can help practitioners to interpret the underlying systems that impact behavior change, to explain relationships between different factors or variables that are relevant to the interventions and to make predictions and generalizations for similar phenomena (Luca and Suggs, 2013; Manikam and Russell-Bennett, 2016; Basil, 2019).

In relation to the netnographic study, it was observed that the OHCs are controlled by a central group of users that are responsible for most of the support provision and dictate the pro-treatment discourses that are imposed in the forums. To obviate the barriers that arise from group thinking and collective processes of uncertainty management, this research draws on social exchange theory (Blau, 1964) and suggests the promotion of voluntary self-disclosure in the forums, in exchange for symbolic online status, to further stimulate generalized reciprocity and enrich the forums repertoire of knowledge while reducing the level of social control exerted by the core group of central users. We also noted how distinct and contradictory identities in the OHCs, based on specific consumption interests in these uncertain treatments, can constitute a relevant barrier to effective support sharing and emphasized the importance of users' segmentation. Finally, the netnographic analysis suggested that the users of these OHCs are distrustful of health professionals and that they are confused about government policies regarding these treatments. The degree of skepticism and disappointment among users with the healthcare system and public policies lead us to suggest that public authorities and health professionals should be involved in social marketing efforts, highlighting the importance of integrated social marketing strategies that consider the downstream (forum users), as well as midstream (health professionals) and upstream (policy) levels to impact the all support system in OHCs.

The quantitative section of the study reconfirmed what was apparent from the netnographic analysis, that users mostly search for informational types of support in

these OHCs. Based on optimal matching theory (Cutrona, 1990; Cutrona and Russell, 1990) it was concluded that, from the perspective of users, informational support is the typology of social support that better matches the stressors related with treatment uncertainty. Consequently, social marketing efforts intended to stimulate forum participation should emphasize the OHCs as privileged places for knowledge exchange. It was also suggested that social marketeers should explore the different roles that users play in these OHCs and define suitable social marketing strategies for each relevant segment with the objective of improving the quality of social support interactions. Based on the results of the cluster analysis, it was suggested for social marketers to target the segment of the older and most active "knowledge seekers" because these users, due to their experience in the forums and the knowledge they were able to accumulate are in a better position to evolve and assume the more demanding role of support providers. To minimize some of the potential negative aspects of social support (i.e. relational conflicts, disputes, verbal aggression in the forums) it was suggested for social marketers to focus on the segment of the "influencers", since these key forum users, due to the central position they occupy the networks, have a strategic advantage in terms of their ability to shape and control the processes of support interaction. Finally, when social marketers intention is to pass a convincing marketing message "community builders" are an important segment to consider because these actors, with their high bonding social capital, benefit from closer and stronger social relationships with other forum users and appear to be the most socially skilled and trustworthy members of the communities.

7.4. Contribution to knowledge and theory

This thesis presented several contributions to knowledge and theory. First, this study generates knowledge on how virtual communities are serving as platforms of social support for groups of individuals that are subject to uncertain health risks and how social capital may influence support exchange and combination behaviors. Second, this research adds to the small body of literature focusing on health uncertainty management, by putting in evidence collective processes of information selection in the online communities, that can hinder the main objective of the OHCs, that is to function as platforms for knowledge acquisition. Through the integration of the theoretical perspectives of social capital, this research put in evidence collective processes of uncertainty management, not captured in well-established theories of uncertainty management, such as URT (Berger and Calabrese, 1975), TMIN (Afifi and Weiner, 2004; Afifi and Morse, 2009) and UMT (Brashers et al. 2000; Brashers 2001; Brashers and Hogan 2013), which are mostly focused on individual and interpersonal processes of

uncertainty management in dyad relationships. Third, this study presents a scoping review of social marketing interventions in the health context that operationalize the social support concept, something that has not been done to date. This scoping review is all the more important in view of the lack of conceptual literature discussing social support from a social marketing perspective. Finally, one additional area of significance for this research is the methodological design. The naturalistic and unobtrusive approach and the uncommon combination of netnography and SNA suited the challenges posed when studying social interactions in the online environment and the difficulties in accessing these communities, caused by a certain social stigmatization of people that make use of uncertain treatments.

7.5 Limitations and future research

Some limitations should be taken into consideration when utilizing and interpreting the results of this research and there are several opportunities for future studies, both of which will be addressed next.

Concerning the scoping review of social marketing interventions that operationalize the social support concept, it was decided to only select interventions that fully complied with Andreasen's (2002) six benchmarks of social support, an option that considerably limited the number of interventions selected for analysis. A less stringent approach would have expanded the scope of the review, however, from our perspective, the results would have been flawed by considering interventions that do not follow the most basic principles of social marketing. Second, we acknowledge that the academic articles reviewed in this study may not contain all pertinent information regarding the social marketing interventions they described, and, therefore, the information may not have been fully comprehensive. In most cases, the typology of social support being operationalized (informational, emotional, esteem, network or tangible support) had to be inferred from the description of the interventions and this constitutes a limitation of the present review that must be acknowledged. Finally, the study shared the well-known limitations of reviews, which are primarily the variable use of keywords and databases. Several combinations of keywords were tested and those that offered better quality results were selected, and all relevant databases that were accessible were used. The findings of the scoping review suggest that several questions remain unanswered in probing the relationship between social marketing and social support. Next, we identify some possible avenues for future studies. First, it is unclear from the review whether social marketing interventions that operationalize social support are effective in delivering behavior change. The effectiveness of social marketing interventions is a

critical aspect given the social impact and public expenditure on these programs (Manikam and Russell-Bennett, 2016). Meta-analysis and systematic review studies are needed to explore this research gap. The importance of disentangling causal effects between social support and health emphasizes the relevance of social support outcome measurement in field interventions, which are a condition to evaluate the effectiveness of interventions. Second, for social support to occur, potential recipients must recognize the need for support and be willing to accept assistance from others and these factors are influenced by peoples' perceptions of their own abilities and expectations of others (Finfgeld-Connett, 2005). On the other side, the simple fact that some individuals are more effective in obtaining the support that they need from their natural networks of relationships, suggests that social support may require a specific set of social skills (Taylor, 2011). Research can focus on understanding what type of skills are necessary to take advantage of support provision. Are these skills dependent of the objectives of the intervention, the source of support, the nature of stressors, or the typology of social support being considered?

Most social support research has been directed at support needs, while limited attention has been given to social support providers. Empirical research on caregiving has demonstrated that those that provide support to others, due to the demanding nature of their roles, can also be considered a high-risk group, and can benefit themselves from social support assistance (e.g. Barnes and Nolan, 2019; Dam et al., 2019; Sharda et al., 2019). Additional research is needed to understand how social marketing interventions that intend to enhance support provision can also help support providers to cope with the emotional challenges they face. For this it is essential to get a better understanding of the cognitive processes underlying support giving. Research can explore when, why, and how giving support is detrimental for the support provider.

There are also some limitations related with the netnographic study. First, it relies on the analysis of message exchange in the forums and it is assumed that users' posts represent truthful reflections of their opinions and feelings. However, there is no guarantee that the contents reflect genuine honest communications. Kozinets (1998) alerts that some individuals may forge specific personalities for online forums. For example, trolls are individuals who pose as genuine forum members engaging in seemingly legitimate discussion, but with the purpose of manipulating the discussion through misrepresentation of their true opinions (Larsen, 2014). However, the impact of trolling on netnographic research outcome is mainly considered a risk in studies of very small communities, or limited to a small number of posts, where trolls may have a significant impact (Donath, 1999), which is not the case. Second, the study did not consider the

socio-demographic characteristics of users that may affect the nature of support interactions due to the fact that such information is not consistently available in the OHCs. Forum members are not obligated to disclose personal information, and only a very few decide to do so. Third, the focus of this study was on the examination of enacted support or occurring social support interactions in online communities, but it remains to be explored whether such interactions are indeed perceived as being supportive from the perspective of the receivers. We believe that the research procedures, which implied the reading of the all sequence of messages in each individual thread and the participant-observation phase of the study allowed the authors to gain a deep understanding of context and the reactions of support recipients. Still, the use of surveys could further complement the results of this study by providing a means to consider the socio-demographic variables that may affect support provision and how social support is being perceived and valued from the recipients' perspective. Future research can also explore the perspectives of other actors of the social support system. For example, research can focus on analyzing how policy makers and medical professionals can contribute to the OHCs and how they envision the benefits and barriers to their participation. Government involvement in OHCs can play a key role in capturing users' favorable opinions about public health while simultaneously generating greater citizenship and higher levels of government trust. OHCs can provide improved and segmented accessibility of public authorities to the consumers of uncertain treatments, constituting a privileged space for public health information strategies targeting these publics. Medical professionals may feel reluctant to participate in OHCs because of internet perceived risks, such as loss of confidentiality in doctor-patient interactions, difficulties in the process of diagnosis and advice without presential consultation, and fears of disempowering effects and lack of control over their professional role (Guo et al., 2016; Atanasova et al., 2018). While OHCs may challenge traditional power dynamics between medical professionals and patients, doctors engagement with the OHCs can contribute to enhanced professional reputation, better understanding of patients' longings, needs and motivations, and easy access to the popular knowledge that is disseminated in these forums (Xing et al., 2017; Fernandes et al., 2018).

Concerning the quantitative section of the study, it also presents several limitations worth noting. First, the study is focused on two specific OHCs facing treatment uncertainty; thus, the conclusions cannot be generalized in a pure positivist sense. Furthermore, the decision to extract the most recent threats instead of a random sample of threats or messages was based on similar studies (Vydiswaran et al., 2014; Chewning and Montemurro, 2016). The rationale behind this decision is that online forums usually

take time to stabilize (Urbanoski et al., 2017), and active forum users may change significantly over long periods of time. Selecting a random sample of messages from all the forums would significantly reduce the number of peer-to-peer interactions of the same users for the network analysis. Furthermore, relational data are potentially problematic to analyze, as they are statistically non-independent and thus violate assumptions of conventional statistical tests (Isba et al., 2017). Still, generalization in critical realism, which is the philosophical stance that guided this study, has a different meaning; it concerns the degree of abstraction of the explanatory model (Avenier and Thomas, 2015). The SNA allowed us to unveil a set of relations and properties of the network structures that explain forum users' social support real behaviors (i.e. scale-free and small world properties, reduced indexes of reciprocity and a clustering model applicable to both OHC's) and these specific mechanism, that integrate the explanatory model, are recognized as capable of being operative in other similar situations. In terms of future research, longitudinal studies can focus on understanding the evolution of these OHCs and on evaluating any significant changes in network morphology resulting from the range of contextual factors that may affect the perceived levels of uncertainty, such as new medical evidence relating to these treatments, public health policies, clinical guidelines, and differences in price and accessibility of treatments. Experimental research is also needed to understand how the structural characteristics of the networks and alternative network configurations may affect the flow of social support resources between network members. To conclude, we hope this research sparks other studies and projects that are capable of enhancing our understanding of OHCs as privileged spaces for support interaction, and that contribute to advance knowledge in the field of social marketing. The continued rise in popularity of OHCs means that its importance as an emergent area of research will continue to grow.

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Appendice

Appendix 1 - Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	80
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	n.a.(more suitable for an academic article)
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	58-60, 71
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	80
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	80-81
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	81
Information sources	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	81
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Protocol
Selection of sources of evidence	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	81
Data charting process	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	81 (and protocol)
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Protocol
Critical appraisal of individual sources of evidence	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	n.a.(not compulsory in scoping reviews)
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	81-82

Appendix 1(continued)

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	83
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Appendix 2
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	n.a. (outside the scope of this review)
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Appendix 2
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	84-88
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	89-95
Limitations	20	Discuss the limitations of the scoping review process.	162-163
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	95-98
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	n.a.

Appendix 2 - Social marketing interventions that operationalize the concept of social support

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
Oregon Communities Programme/ United States/Biglan et al., 1987; Ary et al., 1990	Students from middle, junior high and high schools and respective parents, in three Oregon districts.	1. Behavior change goal: lead students to recuse offers of cigarettes and support peers' refusal of cigarettes. 2. Consumer research: pre-test assessments and questionnaires. 3. Segmentation and targeting: curriculum content adapted to each target group (students, parents, peers). 4. Marketing mix: Product: resistance skills for dealing with negative social influences to smoke; Price: social relationships – social integration problems when refusing offers of cigarettes; Promotion: five-session curriculum focused on sensitizing students to pressures to smoke and effective ways to respond to these pressures, videos, posters, teacher training, social support from peers; Place: classroom, home. 5. Exchange: friends and parents social support, information that can be used in combating pro-smoking pressures from others. 6. Competition: negative social support and influences.	Informational support (teachers, peers, parents), network support (peers) and emotional/esteem support (peers, parents).	Randomized controlled trial. Results: variable impacts for different subgroups of adolescents. The refusal skills program produced lower rates of smoking than the control condition for students who were smokers at the pre-treatment assessment but may had produced negative effects among males who were non-smokers at the pre-test. The provision of parent messages to stimulate parents-children social support did not affect outcome. Method of assignment (schools vs classrooms) failed to produce significant effects.
Pawtucket Heart Health Program/ United States/Carleton et al., 1995; Gans et al., 1999	Adults in a Rhode Island city with low household income	1. Behavior change goal: reduce cardiovascular risk behaviors. 2. Consumer research: formative evaluation and pilot testing of programme elements. 3. Segmentation and targeting: targeted individuals facing cardiovascular risks and community actors. 4. Marketing mix: Product: reduced risk factors for cardiovascular disease; Price: time and effort to lose weight and quit smoking; Promotion: Education, counselling, media, community, and worksite activities. Place: restaurants, grocery stores, places of community events. 5. Exchange: participants received certificates of appreciation. Social support for new behaviors. 6. Competition: difficulties in adaptation and lack of social support for behavior change in different community settings, low literacy skills and costs.	Informational support (community volunteers) and emotional/esteem support (community volunteers).	Quasi-experimental, with Pawtucket receiving the intervention and another city acting as comparison. Results: smoking prevalence declined in both Pawtucket and the comparison community by a similar amount. Non-significant results.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
Project ALERT/ United States/Ellickson and Bell, 1990; Bell et al., 1993; Ellickson et al., 1993	Junior high school students in California and Oregon	1. Behavior change goal: reduce use of substances (alcohol, tobacco, marijuana) . 2. Consumer research: focus groups with students, pilot test of delivery methods. 3. Segmentation and targeting: targeted students at appropriate age for prevention actions. Curriculum content designed to be age appropriate. 4. Marketing mix: Product: skills to resist substances; Price: increased drug-related knowledge; Promotion: curriculum, teen leaders social support, weekly lessons, various media outlets; Place: schools 5. Exchange: benefits of non-use. 6. Competition: normative beliefs that drug use is widespread and acceptable.	Informational support (teachers, health educators), network support (peers) and emotional/esteem support (peers).	Randomized controlled trial comparing health-educator-led group, teen-led group and control group. Results: results showed that the curriculum successfully dampened cognitive risk factors for both cigarettes and marijuana. However, it had a limited impact on beliefs about alcohol.
TVSFP (Television, School and Family Project)/ United States/Flay et al., 1995	7th grade pupils in Los Angeles and San Diego schools and respective parents	1. Behavior change goal: smoking cessation. 2. Consumer research: interviews, focus groups and pilot-testing. 3. Segmentation and targeting: curriculum designed for junior high school students. Television programming tailored for 7th grade students and parents. 4. Marketing mix: Product: social resistance skills training against peers and media influences, smoking prevention and cessation; Price: copping efforts; Promotion: curriculum designed to reinforce self-management trough social support and to emphasize maintenance and recycling in the event of relapse, mass media, homework; Place: schools, workplaces, home. 5. Exchange: benefits of non-smoking, small rewards and enjoyable alternatives to smoking. 6. Competition: lack of resistance skills, relapse.	Informational support (peers, parents), network support (peers) and emotional/esteem support (peers, parents).	Randomized controlled trial. Project was designed as an efficacy trial, to test "social resistance" prevention and "social support" effects on smoking cessation. Results: significant changes in mediating variables, such as knowledge, prevalence estimates and coping efforts, but no consistent effects on Behavior change.
Vermont mass media (plus school intervention)/ United States/Flynn et al., 1992; Flynn et al., 1994	4th-10th grade students in two Vermont communities	1. Behavior change goal: smoking cessation. 2. Consumer research: formative and pretesting research based on diagnostic surveys and focus groups. 3. Segmentation and targeting: curriculum designed to be age appropriate. Communication tailored for "conformists" and "rebels". 4. Marketing mix: Product: refusal skills; Promotion: radio and television, curricular materials, annual teacher training; Place: schools, home 5. Exchange: offers of social support for non-smoking. 6. Competition: pro-smoking social norms.	Informational support (teachers).	Quasi-experimental, comparing school and media and school-only conditions. Results: Significant reductions in reported smoking, along with consistent effects on targeted mediating variables, were observed for the media-and-school group.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
North Karelia Project (youth component)/ Finland/Puska et al., 1981; Vartiainen et al., 1983; Vartiainen et al., 1998	12-13 year olds in 6 schools in North Karelia	1. Behavior change goal: reduce cardiovascular risk Behaviors, by reducing smoking. 2. Consumer research: medical exams, surveys (children participating filled in a questionnaire assessing their health knowledge, social normative beliefs, social norms, peer pressure, skills for resisting social pressures, social support, and relationship with parents), pilot testing. 3. Segmentation and targeting: activities targeted several groups of population. 4. Marketing mix: Product: reduce cardiovascular risks by smoking cessation; Price: perceived social desirability of smoking, lifestyle change; Promotion: curriculum, community activities, community influencers; Place: Schools. 5. Exchange: social support and skills for coping with stress. 6. Competition: social influences and pressures to smoke.	Informational support (teachers, peer leaders, school nurses), network support (peers) and emotional/esteem support (school nurses).	Quasi-experimental, comparing health-educator led and teacher-led programmes with control. Results: immediately after completion of the program one-third fewer students reported smoking at least once a month in both intervention groups than in the control group. Six months and 2 years later, results were much the same. At 8-years, a preventive effect persisted only in the schools with teacher-led programs. At 15 years, differences between program and control schools were no longer statistically significant.
Alabama workplace quit smoking programme/ United States/ Windsor et al., 1988; Windsor and Lowe, 1989	University of Alabama employees	1. Behavior change goal: smoking cessation. 2. Consumer research: pre-tests, employee inputs to programme design. 3. Segmentation and targeting: intervention designed for working environment; components individually tailored. 4. Marketing mix: Product: smoking cessation; Price: concerns about weight control, stress on the development of new Behavioral patterns; Promotion: one-to-one advice, diary, manuals, social support by buddy system; monetary incentives; Place: workplace. 5. Exchange: monetary incentives, buddy support, motivation. 6. Competition: stress in the development of new Behavior and concerns about weight control, relapse.	Informational support (peers), network support (peers), emotional/esteem support (peers) and tangible support (monetary incentives)	Randomized, 2 x 2 factorial pre-test/post-test control group design (i) cessation manual, (ii) manual plus skills training and buddying, (iii) manual plus financial incentives, (iv) all. Results: individuals receiving a multicomponent program were most successful in quitting and remaining abstinent. The monetary incentive appeared to had no effect on quit rate.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
(GEMS) The Girls Health Enrichment Multi-Site Studies/ United States/Baranowski et al., 2003; Story et al., 2003	African American girls aged 8-10, and their parents in homes, schools and summer camp. Texas and Minnesota	1. Behavior change goal: lead people to adopt Behaviors of obesity prevention 2. Consumer research: formative assessment including focus groups. 3. Segmentation and targeting: African American girls aged 8-10 with a certain range of body mass index. 4. Marketing mix: Product: Behavior being promoted i) to increase girls' fruit and vegetable consumption, ii) to increase girls' intake of water, and iii) and to promote moderate to vigorous physical activity; Price: disliking vegetables and water, disliking physical exercise; Promotion: group sessions and activities, parent programmes, events, summer camp. Place: hommes, schools, summer camp. 5. Exchange: symbolic incentives offered for continued participation. Social support through buddy system. 6. Competition: lack of continuous interest and participation in the program. Potential negative influence of family members.	Informational support (trained staff members, peers, parents), network support (peers) and emotional/esteem support (peers, parents).	Randomized controlled trial. Results: After adjusting for baseline body max index (BMI), there were no significant differences in BMI between Treatment and control group, either at the end of the 4-week summer day camp, or after the full 12-week intervention. By the end of the summer camp, the subgroup of treatment group girls heavier at baseline exhibited a significant trend toward lower BMI, compared to their heavier counterparts in the control group. Overall results at the end of the 12-week program demonstrated differences (non-significant) between treatment and control groups.
An Innovative Program for Changing Health Behaviors/ Australia/Burke et al., 2002; Burke et al., 2004	Couples cohabiting for less than 2 years in Perth, Western Australia	1. Behavior change goal: lead young couples to increase levels of physical activity, promote healthy diet and weight control. 2. Consumer research: focus groups and pilot testing. 3. Segmentation and targeting: couples cohabiting for less than 2 years in Perth, Western Australia. 4. Marketing mix: Product: physical activity, healthy diet and weight control. Price: costs and barriers to a healthy lifestyle; Promotion: mail groups, interactive group sessions, individual or group counselling, leaflets, newsletters, workshop sessions. Place: home. 5. Exchange: support in goal setting. Social support. 6. Competition: barriers to Behavioral change, including injuries during exercise, costs of healthy diet, stress, difficulties in time management.	Informational support (couple partner and other couples), network support (other couples) and emotional/esteem support (couple partner and other couples).	Randomized controlled trial. Results: physical activity levels increased; however group differences were non-significant. Changes for self-efficacy and stage of change to physical activity were non-significant. Reduction in BMI, blood pressure and cholesterol levels.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
Project BreakFAST/ United States/Nanney et al., 2016; Mumm et al., 2017	9th- and 10th-grade students in 16 schools in rural Minnesota	1. Behavior change goal: increase social support for eating breakfast. 2. Consumer research: pilot study and data collection: dietary recalls, height and weight measurement and computer-based survey. 3. Segmentation and targeting: students that reported eating breakfast fewer than three times in a normal school week, with skills in reading and writing English and access to a phone and the Internet. Marketing mix: Product: breakfast taking, breakfast services; Price: costs of food; Promotion: Grab and go cart, bringing food service staff out of the cafeteria, peer encouragement, door hangers; Place: school. 5. Exchange: students' positive social interactions that encourage eating school breakfast with social support and role modelling from peers and teachers. 6. Competition: students skipping breakfast to lose weight.	Informational support (teachers, peers), network support (peers) and emotional/esteem support (peers).	Randomized controlled trial. Results: The effect of intervention on change in social support was examined using linear mixed models. The students in the intervention group showed a significant higher level of social support post intervention than the control group. Most of the overall social support change was explained by a change in the "other kids at my school" and "school staff" categories.
Madres para la Salud (Mothers for Health)/ United States/Keller et al., 2012	Sedentary Hispanic women	1. Behavior change goal: according to the authors, the Behaviors targeted were threefold: enhancing social support, increasing physical activity and reducing body fat. 2. Consumer research: questionnaires, information from the 2010 US Census data and the American Community Survey data. 3. Segmentation and targeting: sedentary Hispanic women. 4. Marketing mix: Product: social-support walking intervention to manage weight; Price: time spent; Promotion: brochures, posters and formal media, personal selling of the product among community partners, sponsored tables at events, advisory group; Place: community neighborhoods involving the identification of routes in safe areas; Partnerships: support interventions with Promotora, advisory groups. 5. Exchange: participation incentives that identified women as part of a program, incentives such as baby wipes, pacifiers, loaned strollers, beauty products and small household items, incentives for goal achievement. 6. Competition: formative work showed that women carefully weighed participation in the program against the responsibilities of family life.	Informational support, including appraisal (peers, program officers), emotional/esteem support (family, friends, peers), tangible support (instrumental support through program officers).	Non-experimental, with control before-and-after intervention. Participants in the intervention group had weekly walking sessions and support interventions while participants in the attention-control group received health newsletters and follow-up phone calls. Data were gathered at baseline, 3, 6, 9 and 12 months using questionnaires assessing social support, neighborhood resources and a subset sample for body scans as well as objective and self-report measures of walking adherence. Social support was assessed with two scales. Results: The results show that while social support increased during the active intervention delivery, it declined to pre-intervention levels by the end of the intervention.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
Fit and Fab/ United Kingdom/Withall et al., 2012	Low-income groups. Intervention area was Southmead, and the control area Filwood, (both suburbs of Bristol, UK)	1. Behavior change goal: lead people to increase participation in physical activity. 2. Consumer research: survey and interviews. 3. Segmentation and targeting: individuals with an awareness of the benefits of exercise and positive attitudes towards it. 4. Marketing mix: Product: dance and gym sessions; Price: time, energy and psychological costs; Promotion: outdoor banners; door drops, street leafleting, community actions, posters, face to face recruitment, local press, campaign blog, loyalty scheme; Place: local leisure center; People: session leaders were encouraged to maximize fun and enjoyment. 5. Exchange: socializing is associated with adherence to exercise, so free tea and coffee was available before and after sessions and socializing and social support was actively encouraged. 6. Competition: anxiety-related barriers, lack of relatedness and a perceived lack of competence and autonomy. Issues of time and fitting exercise into the daily routine.	Informational support (peers lead by a professional), network support (peers) and emotional/esteem support (peers).	Quasi-experimental, controlled before-and-after study design. The intervention area was Southmead, and the control area, Filwood, both suburbs of Bristol, UK. Attendance data were collected weekly and analyzed monthly to provide a view of changing participation over the six-month intervention period, as compared to attendance at pre-existing sessions in the intervention area and in a control area. Results: Drop-out rates in the intervention area were similar to the control area, and considerably lower than in pre-existing sessions.
HEALTHY/ United States/Hirst et al., 2009	Students in 42 middle schools, six at each of seven locations across the country, with 21 schools randomized to receive the intervention and 21 to act as controls.	1. Behavior change goal: lead students to increase consumption of water and healthier foods and physical activity. 2. Consumer research: pilot and feasibility studies. 3. Segmentation and targeting: based on school eligibility criteria, including the student body being representative of the adolescent population at risk for type 2 diabetes. 4. Marketing mix: Product: physical activity and improved diet; Price: less time spent in sedentary Behaviors, lifestyle changes; Promotion: messaging, cafeteria-based educational events, taste tests, lessons, training sessions, classroom activities, family outreach newsletters, take-home packages of materials, volunteer student peer communicators were recruited and trained to help deliver the intervention components; Place: schools, home 5. Exchange: parents were given written results of their child's physical assessments at baseline and end of study. 6. Competition: water versus added sugar beverages; physical activity versus sedentary Behavior; high-quality versus low-quality food.	Informational support (teachers, staff from the program, peers), network support (peers), emotional/esteem support (parents, peers).	Cluster design trial. Measurements and observations were made at the school and included: health screening, blood laboratory analysis, students self-report instruments, students' fitness, schools food environment, activity levels, students academic performance. The results indicated no significant differences at baseline between the intervention and control school participating students for any of the characteristics or measurements.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
The ACCESS (Adolescents Connected to Care, Evaluation, and Special Services). Campaign name: HIV. Live With It. Get Tested!/ United States/Futterman et al., 2001	Youth who were disproportionately infected with HIV. Intervention in the cities of New York, Baltimore, Los Angeles, Miami, Philadelphia, and Washington, DC.	1. Behavior change goal: increase HIV testing. 2. Consumer research: focus groups, interviews, literature review. The advertising concepts were tested for local relevance 3. Segmentation and targeting: sexually active youth of color in high seroprevalence communities, particularly heterosexual females and homosexual/bisexual males. Health care providers were the secondary target group. 4. Marketing mix: product: HIV testing. Price: the "price" was lowered by promoting free; Promotion: town hall meetings and community events. Media outlets of relevance to youth, such as popular radio stations, cable networks, websites, and youth publications, were targeted for editorial coverage. Media vehicles reaching parents, teachers and adult influencers including health care providers and opinion leaders in the African-American and Latino communities were similarly targeted for aggressive media outreach; Place: health centers. 5. Exchange: free testing and counselling. 6. Competition: cost of HIV testing, fear of blood tests	Informational support (peers, health professionals), network support (peers), emotional/esteem support (peers).	The campaign contracted an independent evaluation team to conduct both process and outcome evaluations of the campaign. Results: Increases in HIV testing from baseline during Get Tested Week (Weeks 11 to 15) and the period immediately thereafter (Weeks 16 to 24) when several cities conducted additional testing programs. Increases in percentages of youth who had seen an advertisement about HIV testing, improvements in the percentage who said the advertisement made them think testing was good and increased knowledge about where one could go for HIV testing.
Check Yourself/ United States/Plant et al., 2014	Two Los Angeles neighborhoods with the highest syphilis morbidity among man who have sex with other man.	1. Behavior change goal: promote regular syphilis testing. 2. Consumer research: focus groups and pilot testing. 3. Segmentation and targeting: 2 Los Angeles neighborhoods with the highest syphilis morbidity among man who have sex with man. 4. Marketing mix: Product: Behavior of regular syphilis testing; Price: included any perceived monetary and nonmonetary costs of testing, including embarrassment, inconvenience, fear, and invasion of privacy; Promotion: adds, web site, Spanish-bilingual outreach team that went into the community to directly engage the targeted individuals. 5. Place: neighborhoods, bars and restaurant, restrooms, web site. Exchange: web site had a zip code locator for free syphilis testing to help men overcome perceived barriers to testing related to inconvenience or monetary cost. 6. Competition: embarrassment, inconvenience, fear, and invasion of privacy, monetary costs.	Informational support (program staff), emotional/esteem support (program staff).	Campaign used a time-location sampling methodology for evaluation. Survey assessed demographics, syphilis knowledge, and syphilis testing as well as unaided awareness, aided awareness, and confirmed awareness. Results: Total awareness was not associated with recent syphilis testing in a multivariate model. However, individuals with confirmed awareness were more than 6 times more likely to have been recently tested.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
STYLE (Strength Through Youth Livin' Empowered)/ United States/Hightow-Weidman et al., 2011	Young (ages 17–24) HIVpositive man of color	1. Behavior change goal: retain HIV-positive black and Latino man who have sex with other man in HIV primary care services. 2. Consumer research: youth advisory board and focus groups. 3. Segmentation and targeting: youth and members of their sexual and social networks who were HIV-positive black and Latino man that have sex with man of color; the program involved tailored HIV support services. 4. Marketing mix: Product: provision of HIV testing services, medical–social support network for HIV-infected youth newly diagnosed or reengaging in care; Price: discomfort in discussing issues related to HIV, time constrains; Promotion: HIV testing events; Place: clinical sites, college campuses. 5. Exchange: sponsored HIV testing events. 6. Competition: financial and housing instability, substance abuse, mental health concerns, stigma and isolation.	Informational support (program staff, physicians), network support (peers), emotional/esteem support (peers).	Cross-sectional study design, controlled before-and-after study design. Results: compared to a pre-STYLE cohort, STYLE was an effective intervention that increased HIV diagnoses, engagement in care for both those newly diagnosed and those who had fallen out of care and improved overall retention
Control Your Diabetes. For Life/ United States/Gallivan et al., 2007	Adults with diabetes, focused on racial-ethnic populations	1. Behavior change goal: lead people to control diabetes. 2. Consumer research: literature review, meetings with experts in diabetes education, focus groups. 3. Segmentation and targeting: segmentation of audiences by race/ethnicity. 4. Marketing mix: Product: controlling diabetes; Price: costs of overcoming barriers to diabetes control including financial (e.g., the cost of blood glucose testing supplies), physical (e.g., the pain of blood glucose testing), psychological (e.g., lack of social support), environmental (e.g., abundance of food at family gatherings), or related to time (e.g., lack of time to exercise); Promotion: mass media, internet, educational materials, presentations and exhibits at meetings; Place: workplace, website 5. Exchange: benefits of good diabetes control. 6. Competition: discouraging messages from significant others, lack of social support; family traditions (that oppose eating healthy), lack of access to medical care and the cost of medicines, the inconvenience or pain of blood glucose testing, or the intrusion of a regimented schedule into lifestyle.	Informational support (health professionals), network support (peers), emotional/esteem support (family).	To monitor changes in consumer awareness and Behaviors related to diabetes control, several markers were used: awareness of campaign messages, awareness of blood glucose testing, and awareness of the A1C test over a 3-month period. The NDEP worked with the CDC and the American Diabetes Association to incorporate questions about diabetes in national surveys of people with diabetes and the general public commissioned by these organizations. Results: Over half of people with diabetes indicated awareness of the campaign. Positive trends in practice of blood glucose testing and awareness of the hemoglobin A1C. Good level of partnership activity surrounding the campaign.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
Move More Diabetes (MMD)/ United States/Richert et al., 2007	Adults aged 30 to 70 years with type 2 diabetes	1. Behavior change goal: lead people to engage in physical activity. 2. Consumer research: focus groups and surveys 3. Segmentation and targeting: target was composed by people most likely to reach a 150 min/wk moderate intensity physical activity goal. 4. Marketing mix: Product: 150 minutes of physical activity per week, self-management Behavior; Price: what participants had to gave up to engage in the desired activity, for example, the time they gave up watching television in exchange for engaging in physical activity; Promotion: health care provider referrals, word of mouth, posters in work sites and community settings, Move More Web site, newspaper ads; Place: work sites, health care settings, and faith and community settings; Policy: working with community partners to create and promote physical activity opportunities. 5. Exchange: peer social support, support from Lay Health Educators, motivational e-mails, small incentives (pedometers, water bottles, reflective clothing for walking, etc). 6. Competition: The need to travel for physical activity, lack of companions to train, label of diabetes negatively affects program participation, difficulties to establish natural support between individuals who did not know each other and did not share community connections.	Informational support (peers, Lay Health Educators), network support (peers) and emotional/esteem support (peers, Lay Health Educators, family)	Intervention monitored changes in physical activity in the region and program recognition by the population. Results: Move More Diabetes built a sustainable volunteer network of 35 Lay Health Educators who recorded 1500 contacts with enrollees from 2004 to 2006. Increased physical activity occurred in the adult population during that period; however, it was not possible to attribute that change solely to Move More. MMD used many approaches to encourage physical activity. While this was a strength of the program, it was also a challenge when it came to evaluation because it was difficult to assess the direct impact of any single program component.

Appendix 2(continued)

Intervention Name/Country/ Authors	Participants & Setting	SM Characteristics	Support Provision	Results
5-4-3-2-1 Go!/ United States/Evans et al., 2007; Evans et al., 2011	Community areas in Chicago with high obesity prevalence	1. Behavior change goal: increase consumption of fruits and vegetables, water, and dairy. 2. Consumer research: used previous research, conducted by the Sinai Urban Health Institute (SUHI) that described the clinical and sociodemographic characteristics of the overweight and obese populations in the targeted areas, local resources, and data from the Consortium to Lower Obesity in Chicago Children (CLOCC). "Chat and Chew" focus groups conducted with community leaders, service providers, and residents. 3. Segmentation and targeting: the intervention areas were targeted based on high obesity prevalence. The 4 Ps of marketing were adapted to the target communities. 4. Marketing mix: Product: identified as eating right and being healthful; Price: costs of being active and eating well; Promotion: web site to support health promotion activities; high school volunteers to serve as community ambassadors, positive role models; brochures, community media and events, posters in physicians' offices; Place: places where people live and shop, physicians' offices. 5. Exchange: prizes and games to test kids' nutrition and fitness knowledge. 6. Competition: "obesogenic environment"—that is, a social and physical environment that inhibits healthful lifestyles: inability to consume sufficient quantities of fruits and vegetables because of high cost and a lack of convenient access to supermarkets, restaurant offerings in lower income areas that present a barrier to eating a healthful diet outside of home, lack of obesity-related social capital, such as community participation through a social agency, and feelings of trust and safety to use community resources.	Informational support (high school students, counsellors, community workers), emotional/esteem support (parents).	Randomized controlled trial. Parents were randomly assigned to receive either a brief in-home counselling session on benefits of, and overcoming barriers to, 5-4-3-2-1 Go! Behaviors (Treatment) or no counseling (Control). Results: Parents that received counselling consumed significantly more fruits and vegetables at follow- up. Parental exposure to messaging at children's school events was significantly associated with higher water consumption. No significant effects on child Behaviors were observed.