








## ORIGINAL ARTICLE

# The ABC taxonomy for medication adherence translated into French and German

Melanie Haag<sup>1</sup>  | Audrey Lehmann<sup>2,3</sup>  | Kurt E. Hersberger<sup>1</sup>  |  
 Marie-Paule Schneider<sup>4</sup>  | Aurélie Gauchet<sup>2,5</sup>  | Bernard Vrijens<sup>6</sup>  |  
 Isabelle Arnet<sup>1</sup>  | Benoît Allenet<sup>2,3</sup> 

<sup>1</sup>Pharmaceutical Care Research Group,  
University of Basel, Basel, Switzerland

<sup>2</sup>TIMC-IMAG UMR 5525/ThEMAS, University  
of Grenoble Alpes, France

<sup>3</sup>Pharmacy Department, Grenoble Teaching  
Hospital, Grenoble, France

<sup>4</sup>Chair of Medication Adherence and  
Interprofessionalism, School of Pharmaceutical  
Sciences, University of Geneva, University of  
Lausanne, Geneva, Switzerland

<sup>5</sup>Interuniversity Laboratory of Psychology  
(LIP/PC2S) /Clinical Team, University of  
Grenoble Alpes, Grenoble, France

<sup>6</sup>AARDEX Group, Liège, Belgium

## Correspondence

Melanie Haag, Pharmaceutical Care Research  
Group, University of Basel, Klingelbergstrasse  
50, 4056, Basel, Switzerland.  
Email: melanie.haag@unibas.ch

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the University of Grenoble Alpes; the  
University of Basel

**Aims:** We translated the ABC adherence taxonomy (i.e. 7 terms and their corresponding definitions) published by Vrijens *et al.* (2012) into French and German without changing the original meaning with the aim to promote a standardised taxonomy for medication adherence to French- and German-speaking researchers and clinicians.

**Methods:** A Delphi survey was performed. To generate round 1, we identified French and German synonyms for the 7 adherence terms through a literature search in PubMed. Investigators translated the original English definitions into French and German. Panellists were members of ESPACOMP—the International Society for Patient Medication Adherence; experts suggested by ESPACOMP members and first authors of medication adherence publications in French and German. Google forms were used to create online questionnaires. Delphi rounds were performed until consensus was reached. The consensus was defined according to the acceptance rate as moderate consensus (50–75%), consensus (>75–95%), and strong consensus (>95%).

**Results:** The literature search resulted in 4–6 (French) and 4–7 (German) items per English term. Delphi rounds were launched between November 2016 and April 2018. Three rounds sufficed to reach consensus on all terms and definitions from 26 French-speaking and 25 German-speaking panellists. Preferred terms for medication adherence are *adhésion médicamenteuse* (82%) in French and *Medikamentenadhärenz* (88%) in German.

**Conclusion:** The use of a common terminology for medication adherence with translations in French and German will contribute to standardise the vocabulary, to harmonise research projects and ultimately ease comparison of study results among researchers and clinicians.

## KEYWORDS

ABC taxonomy, Delphi method, French translation, German translation, medication adherence

## 1 | INTRODUCTION

Since the introduction of the term *compliance* in the field of medicines in 1976<sup>1</sup> to describe the patient's behaviour of following a medical recommendation, its definition was subject to interpretations several times during the subsequent years. In the 1990s, the term was replaced by *adherence*, which emphasises patients playing a more active role and the need for agreement between patients and healthcare providers.<sup>2</sup> With growing research, different terms and definitions emerged in the literature such as adherence,<sup>3</sup> concordance<sup>2</sup> and treatment fidelity<sup>4</sup> leading to confusion and misunderstandings, and impeding the comparison between study results. In 2012, a European initiative (ABC, Ascertaining Barriers for Compliance) proposed a new taxonomy to provide a common language for researchers and clinicians in the field of medication adherence.<sup>5</sup> With a harmonised English terminology, the authors promoted a consistent use of terminology and operationalised definitions in order to increase the quality of research in medication adherence. The ABC taxonomy proposes 7 terms and their definitions: (i) medication adherence, (ii) initiation, (iii) implementation, (iv) persistence, (v) discontinuation, (vi) management of adherence and (vii) adherence-related sciences. However, in languages other than English, different medication adherence terms and definitions are still commonly used in local medical literature as well as among clinicians and researchers, such as *observance*,<sup>6</sup> *compliance*<sup>7</sup> and *adhésion*<sup>8</sup> in French (F) and *Einnahmetreue*,<sup>9</sup> *Medikamentenadhärenz*<sup>10</sup> and *Patientencompliance*<sup>11</sup> in German (G).

We selected French and German languages because they belong to the 10 most commonly spoken languages, with worldwide 270 million French speakers (in France [80 million], and in 29 nations with official French language such as Canada [7 million], Belgium [4 million], Switzerland [2 million], Luxemburg, Monaco and several African nations [115 million]), and 105 million German speakers [in Germany [80 million], Austria [8 million], Switzerland [4.6 million], Belgium [75 000], Luxemburg and Liechtenstein).

Consensus methods exist to gather opinions of experts and obtain their formal agreement. Several techniques have been developed.<sup>12–14</sup> We adopted the Delphi method because it is a systematic procedure, which gathers the opinion of a group of experts in the most reliable manner.<sup>15</sup> It is characterised by iterating rounds (i.e. to allow participants to change their opinion) and by presenting results of previous rounds to panellists.<sup>16</sup> In addition, this method provides anonymity and confidentiality and allows independent thinking without the dominance of influential participants. Further, it can be performed remotely with online questionnaires and thus, incorporates participants who are geographically dispersed in a cost- and time-effective manner.<sup>17</sup> Furthermore, it has been applied widely within the healthcare field<sup>18,19</sup> as well as for the translation of instruments.<sup>20</sup> In this survey, we aimed to translate the ABC taxonomy into French and German without questioning the meaning of the original terms and definitions.

### What is already known about this subject

- In 2012, a new taxonomy (ABC) described medication adherence as a process consisting of (A) initiation, (B) implementation and (C) persistence.
- The ABC taxonomy has yet not been translated into other languages than English.
- In other languages, different terms and definitions exist leading to confusion and misunderstanding.

### What this study adds

- This study offers a standardised medication adherence terminology to French- and German-speaking researchers and clinicians.
- The use of a unique terminology in medication adherence research will facilitate harmonisation in research and practice.
- This harmonised terminology across 3 languages will contribute to increase the comparability of future research in medication adherence.

## 2 | METHODS

A Delphi survey was performed with the 7 adherence terms and their definitions according to Vrijens *et al.*<sup>5</sup> Consensus on the translated items was defined according to the acceptance rate as moderate consensus (50–75%), consensus (>75–95%), and strong consensus (>95%). An acceptance rate of <50% indicates disagreement.<sup>21</sup> We used Google forms to create online questionnaires, which were tested for clarification and comprehensibility with 6–9 researchers before sending to the panellists. Dissemination was performed through emails containing the active link to the survey. One or 2 reminders were sent after 2 weeks at the earliest.

The panellists were recruited from ESPACOMP, the International Society for Patient Medication Adherence ([www.ESPACOMP.eu](http://www.ESPACOMP.eu); approximately 3000 members)—an international society dedicated to research and education in adherence. All members were invited by email to participate if they were French or German speaking. Snowball sampling was used whereby experts were asked to send the survey to other experts in medication adherence or to mention further experts to the investigators (A.L., M.H.). In addition, first authors of publications on medication adherence were identified through a nonsystematic literature search conducted in PubMed with the MeSH term *medication adherence*, restricted to French or German languages, and published within the last 5 years.

The same search without year restriction served to identify French and German medication adherence terms. All

synonyms for the 7 English terms were retrieved in order to create a first item list. No translations of the 7 definitions were found. Therefore, 2 German-speaking (Swiss) and 6 French-speaking (4 French, 1 Belgian and 1 Swiss) investigators performed a forward translation of definitions according to best practice from English into French and German, respectively, to generate round 1.<sup>20</sup>

In round 1, panellists were asked to select 1 favourite item (single choice) or to propose new terms and definitions in a free text field. After round 1, the investigators (A.L., M.H.) ranked the selected and newly proposed terms by descending order of acceptance rate. Definitions were collated and similar wordings were reduced to a single encompassing statement, with the original words enclosed as variants. In the subsequent rounds, panellists were asked to select 1 preferred item (single choice). Acceptance rates of the previous round were indicated after each item and visible for panellists. Items with <10% acceptance rate were discarded from the next round. Terms with >95% acceptance rate were not integrated into the next round. Definitions highest rated out of 2 items, where 1 item reaches <10% acceptance rate, were not integrated into the next round. Subsequent rounds were sent to those panellists who completed the prior 1. We aimed at reaching at least moderate consensus among panellists on each item (i.e. term and corresponding definition). Because nuances in written languages exist in French between France, Canada, Switzerland and Belgium, and in German between Switzerland, Germany and Austria, we asked linguists to comment on the final French and German terms and definitions.

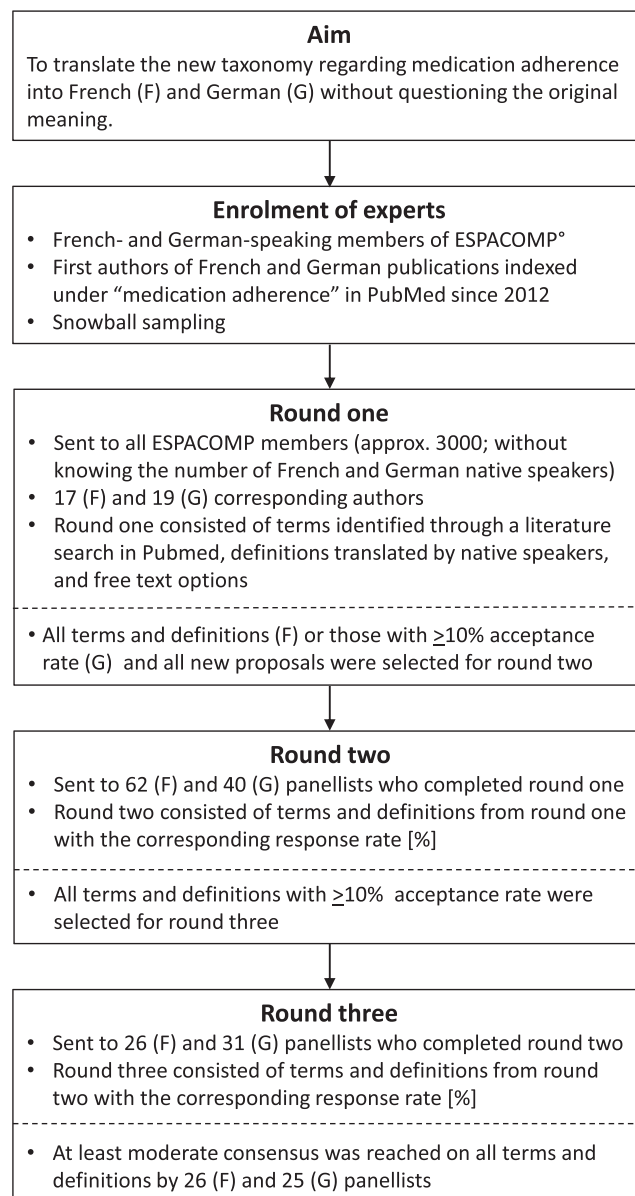
This study was exempt from the review of the ethics committee.

### 3 | RESULTS

Two literature searches were performed in August 2016 (F) and February 2017 (G) and resulted in 4–6 French and 4–7 German synonyms per English term.

Three consecutive Delphi rounds sufficed to achieve at least moderate consensus on all terms and definitions from 26 French-speaking and 25 German-speaking panellists (Figure 1). The French and German versions of round 1 were disseminated on 18 November 2016 and 14 April 2017 to 3059 and 3084 ESPACOMP members, respectively (i.e. to all ESPACOMP members as their native language was unknown) and 17 French-speaking and 19 German-speaking first authors. Round 2 was initiated on 31 October 2017 (F) and 26 July 2017 (G) and sent to 62 (F) and 40 (G) panellists. Round 3 was launched on 17 April 2018 (F) and 26 October 2017 (G) to 26 (F) and 31 (G) panellists. Response rates of 42% (F) and 78% (G) in round 2, and 100% (F) and 81% (G) in round 3 were reached.

In round 1, 6 (F) and 7 (G) different nationalities were represented among the panellists, with a majority of French (55%) and German (58%) panellists. In the last round, the number of participating nationalities decreased to 4 (F) and 3 (G) (Figures 2 and 3). All respondents were involved in medication adherence research and covered the professions of pharmacists (F: 42%, G: 45%), economists/health

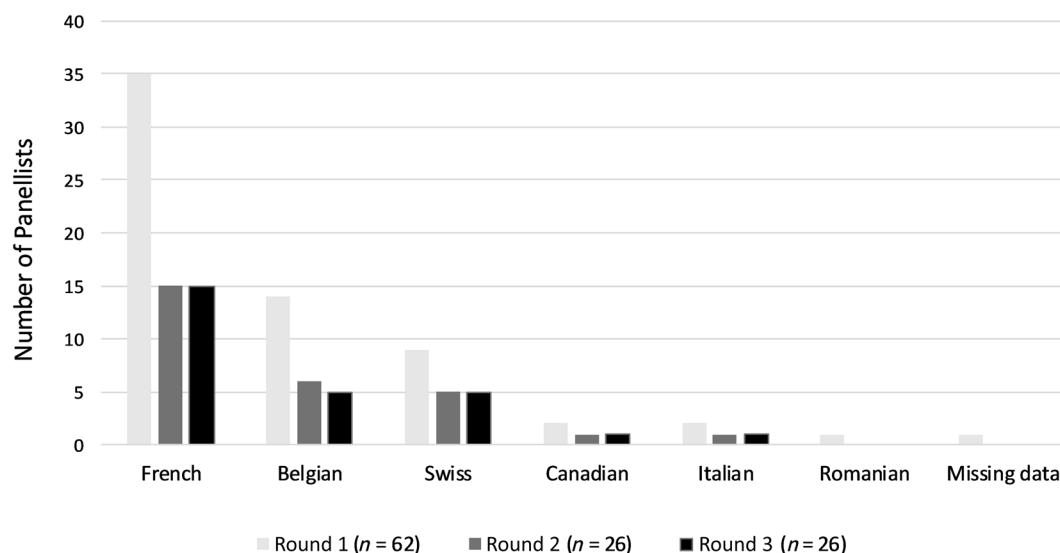


**FIGURE 1** The Delphi process; <sup>o</sup>International Society for Patient Medication Adherence

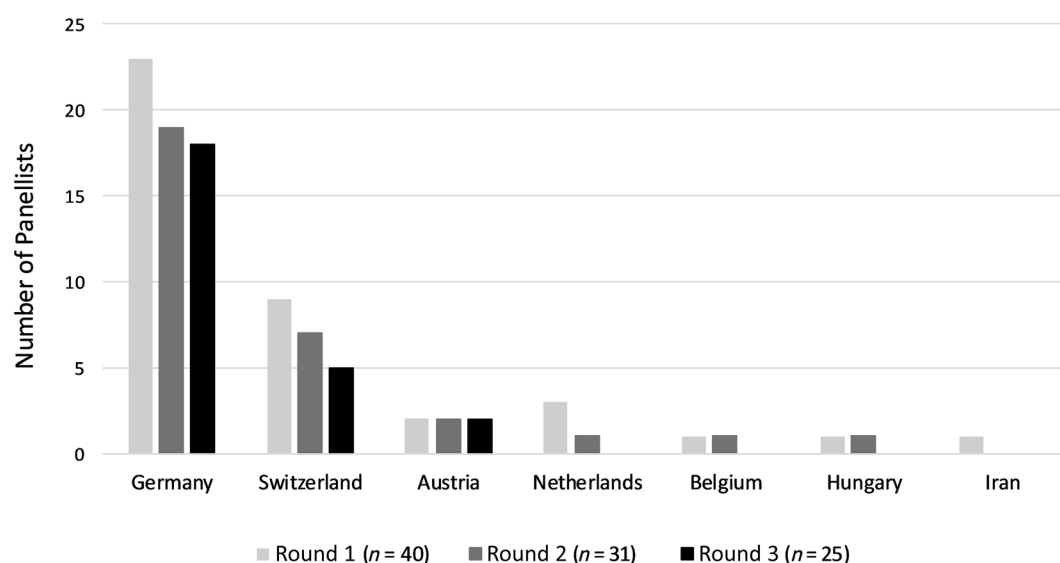
management (F: 24%, G: 8%), physicians (F: 16%, G: 20%), psychologists (F: 15%, G: 5%), nurses (F: 3%, G: 18%) and biologists (F: 0%, G: 5%) in round 1.

#### 3.1 | French and German adherence terms

The French-speaking panellists reached a strong consensus on the terms: *initiation* (100%) and *persistence* (100%) after round 2 and on *disciplines liées à l'adhésion médicamenteuse* (96%) after round 3. The German-speaking panellists reached a strong consensus on the terms *Persistenz* (96%) and *Management der Adhärenz* (96%) after round 3. Consensus was reached on 3 French terms: *adhésion*



**FIGURE 2** Nationalities of the French-speaking panellists in rounds 1, 2 and 3 including double citizens



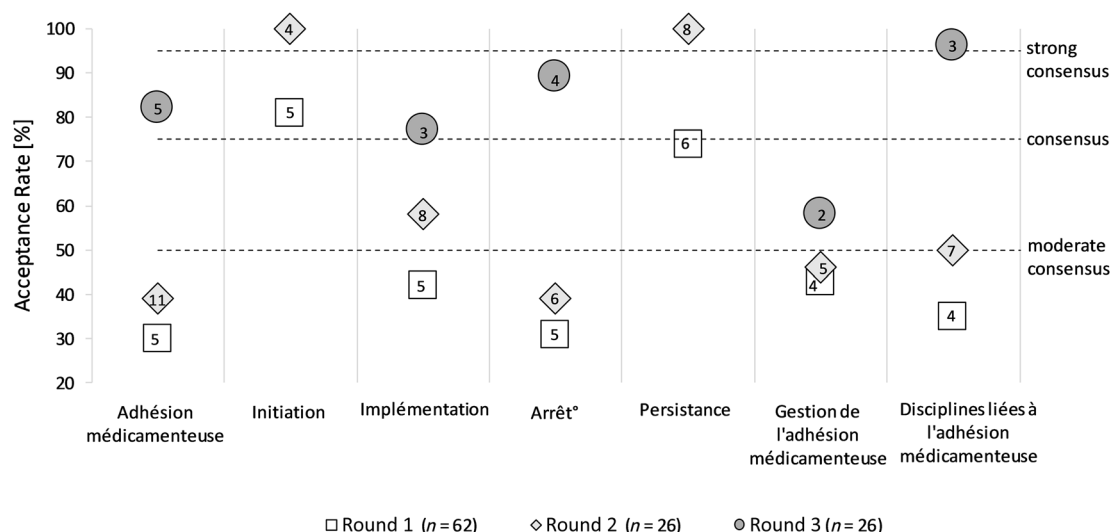
**FIGURE 3** Nationalities of the German-speaking panellists in rounds 1, 2 and 3. No double citizens included

*médicamenteuse* (82%), *arrêt* (89%) and *implementation* (77%). Consensus was also reached on 3 German terms: *Medikamentenadhärenz* (88%), *Therapiebeginn* (92%), and *Umsetzung* (84%). Panellists achieved a moderate consensus on 1 French term *gestion de l'adhésion médicamenteuse* (58%) and 2 German terms *Therapieabbruch* (56%) and *Adhärenzbezogene Wissenschaften* (64%; Figure 4 and 5).

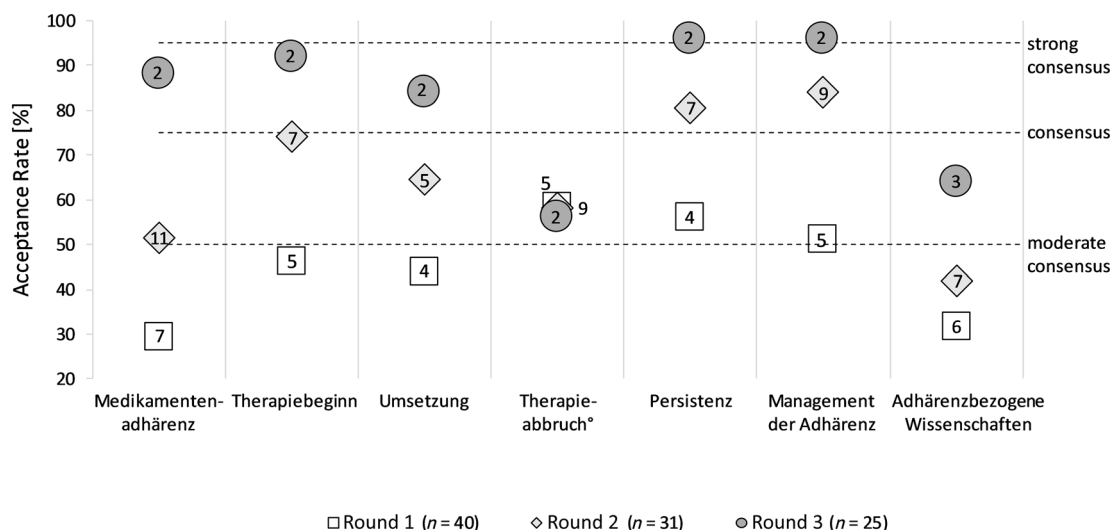
All preferred French and German terms remained favourites from round 1–3, except 1 French term for which 2 terms got equivalent rating after round 1 (*arrêt* and *interruption*). The German term *Therapieabbruch* was bypassed by the term *Abbruch* in round 3 (56 vs 44%; Figure 5).

### 3.2 | French and German adherence definitions

Proposed definitions reached acceptance rates of 65–89% (F) and 59–85% (G) in round 1 and continued to be favourites in subsequent rounds despite new proposals. After round 2, the French-speaking panellists reached consensus on the definition of *initiation* (89%), *persistence* (81%) and *management of adherence* (77%). After round 3, consensus was obtained on 1 F and 4 G definitions and a moderate consensus was reached on 3 F and G definitions. (Figure 6, Figure 7).



**FIGURE 4** Preferred French terms per Delphi round with the number of proposed items in the icon. ° The terms *arrêt* and *interruption* were equally represented after round 1. Terms with 95% or more acceptance rate were not integrated into the subsequent round



**FIGURE 5** Preferred German terms per Delphi round with the number of proposed items in the icon. ° The term *Abbruch* was the preferred term after round 1 and 2. Terms with 95% or more acceptance rate were not integrated into the subsequent round

### 3.3 | Linguistic adaptation

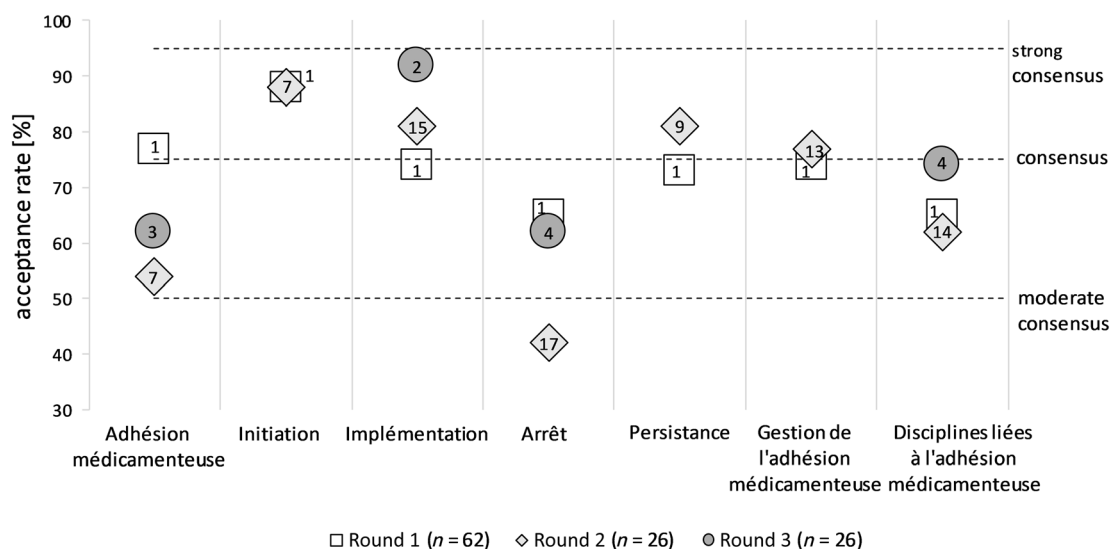
The Laboratory of Linguistics and Didactics of Foreign and native Languages (LIDILEM) from the University Grenoble Alpes commented on the French terms and definitions and identified *implémentation* as Anglicism. Moreover, in French, the word is specific for computer sciences and seemed not suitable for adherence to medication. No other linguistic adaptation was suggested regarding the French taxonomy (Table 1).

German (S.B.) and Austrian (E.F.W.) linguists suggested changes in the German writing style for 1 word in a definition due to the use of *beta* S (ß) in Germany and Austria, and the *double* SS in Switzerland. Besides, the term *Gesundheitsfachperson* occurring in 1 definition is unknown in Germany and Austria and therefore replaced by the term

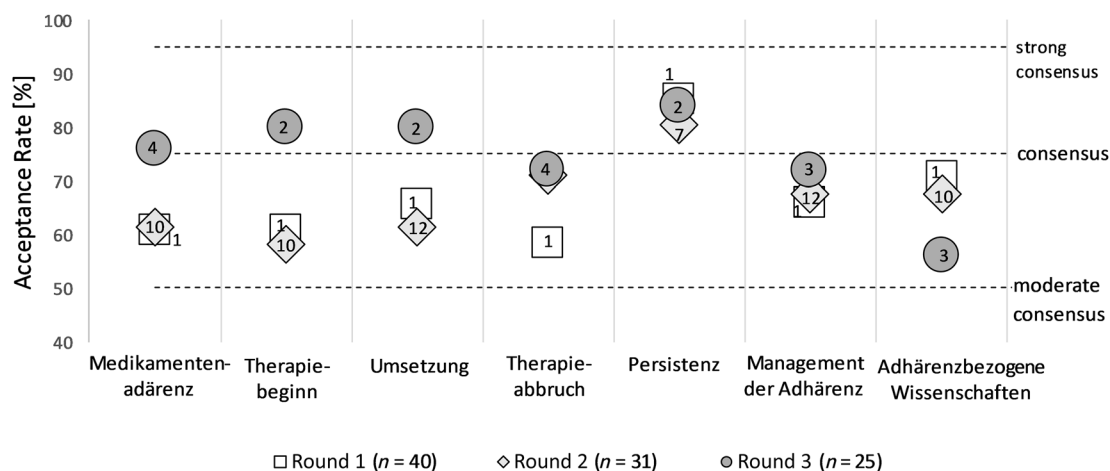
*Heilberufler* (Table 2). Thus, we obtained variations in the writing of 2 German terms and ended up with an Austrian/German and Swiss version for 2 definitions.

## 4 | DISCUSSION

With the performed online Delphi survey, a French and German version of the ABC taxonomy of medication adherence is available for the first time. Researchers communicate not only to other scientists in the field, but also to researchers from other fields, and to the public and policy makers. When communicating with nonexperts, a general recommendation is to avoid professional jargon. However, in the field of medication adherence, every person taking medication and every



**FIGURE 6** Preferred French definitions per Delphi round with the number of proposed items in the icon. Definitions were translated by native speakers and are listed in Table 1. Definitions with 95% or more acceptance rate were not integrated into the subsequent round



**FIGURE 7** Preferred German definitions per Delphi round with the number of proposed items in the icon. Definitions of round 1 were translated by native speakers and are listed in Table 2. Definitions with 95% or more acceptance rate were not integrated into the subsequent round

professional working around patients is a lay expert and uses personal wording to describe their personal history and practice. Most researchers and practitioners outside English-speaking countries adopted the term *compliance* and they keep using it in French and German. However, using the term *compliance* in French is doomed to confusion as specialists in pharmacology and medicine employ the word in the context of the lung's ability to stretch and expand (*compliance thoraco-pulmonaire*). Consequently, after 40 years of adherence research, the need for a clear terminology for clinical research and medical practice arose, comprising a new taxonomy with a set of terms and definitions.<sup>22</sup> Thus, the translation of the 2012 ABC taxonomy in several languages, without questioning the meaning of the initial terms and definitions, is of major importance to create a common path for clinical research and medical practice, and to harmonise future publications.

We sought our expert panel predominantly among ESPACOMP members. Since 1996, this society has evolved to the international reference for researchers and healthcare providers in the science of medication adherence<sup>23</sup> and counts over 3000 members from 38 nations since 2006.<sup>24</sup> Thus, our panellists had substantial knowledge of the topic investigated, which is the most critical factor in the Delphi process. Furthermore, 9-tenths of the experts answering the Delphi round 1 were from French-speaking countries (90%; France, Belgium, Switzerland, Canada) and German-speaking countries (89%; Germany, Switzerland, Austria, Belgium) and covered several healthcare professions. Thus, our purposive sample of panellists was appropriate, ensured interdisciplinary, and our results represent scientific expertise in French and German native languages.

Although no clear guidelines exist concerning the panel size and the number of iterative rounds in a Delphi process,<sup>25</sup> an optimal

**TABLE 1** French translation of the ABC taxonomy and corresponding definitions including the acceptance rate (%) at the corresponding Delphi-round (2<sup>nd</sup>, 3<sup>rd</sup>) including linguistic validation

English taxonomy	English definition	French taxonomy	French definition
Adherence to medication	The process by which patients take their medications as prescribed.	Adhésion médicamenteuse (82%, 3 <sup>rd</sup> )	Le processus selon lequel les patients prennent les traitements comme prescrits. (62%, 3 <sup>rd</sup> )
Initiation	The process starts with initiation of the treatment, when the patient takes the first dose of a prescribed medication.	Initiation (100%, 2 <sup>nd</sup> )	Le processus commence avec l'initiation qui correspond au moment où le patient prend la 1 <sup>ère</sup> dose du médicament prescrit. (89%, 2 <sup>nd</sup> )
Implementation	The process continues with the implementation of the dosing regimen, defined as the extent to which a patient's actual dosing corresponds to the prescribed dosing regimen, from initiation until the last dose is taken.	Implémentation (77%, 3 <sup>rd</sup> )	Le processus continue avec l'implémentation qui correspond à la mesure dans laquelle le traitement réellement pris par le patient correspond à la posologie prescrite de l'initiation jusqu'à ce que la dernière dose soit prise par le patient. (92%, 3 <sup>rd</sup> )
Discontinuation	Discontinuation marks the end of therapy, when the next dose to be taken is omitted and no more doses are taken thereafter.	Arrêt (89%, 3 <sup>rd</sup> )	L'arrêt marque la fin du traitement, quand la dose à prendre n'est pas prise et qu'aucune autre dose du médicament n'est prise après. (62%, 3 <sup>rd</sup> )
Persistence	Persistence is the length of time between initiation and the last dose, which immediately precedes discontinuation.	Persistence (100%, 2 <sup>nd</sup> )	La persistance est la durée entre l'initiation et la dernière dose qui précède immédiatement l'arrêt du médicament. (81%, 2 <sup>nd</sup> )
Management of adherence	It is the process of monitoring and supporting patients' adherence to medications by health care systems, providers, patient, and their social networks. The objective of management of adherence is to achieve the best use by patients, of appropriately prescribed medicines, in order to maximize the potential for benefit and minimize the risk of harm.	Gestion de l'adhésion médicamenteuse (58%, 3 <sup>rd</sup> )	C'est le processus de suivi et de soutien de l'adhésion du patient aux médicaments par les soignants, le système de soin, les patients et les aidants. L'objectif est d'obtenir un meilleur usage des médicaments comme prescrits afin d'augmenter leurs bénéfices et de minimiser les risques liés à leur prise. (77%, 2 <sup>nd</sup> )
Adherence-related sciences	This element includes the disciplines that seek understanding of the causes or consequences of differences between the prescribed (i.e. intended) and actual exposures to medicines. The complexity of this field, as well as its richness, results from the fact that it operates across the boundaries between many disciplines, including but not limited to medicine, pharmacy, nursing, behavioural science, sociology, pharmacometrics, biostatistics and health economics.	Disciplines liées à l'adhésion médicamenteuse (96%, 3 <sup>rd</sup> )	Ce terme comprend les disciplines qui cherchent à comprendre les causes ou les conséquences des différences entre les doses prescrites (comme prévues) et doses réelles des médicaments. La complexité et la richesse de ce domaine résulte du fait qu'il est à l'interface de nombreuses disciplines que sont notamment mais pas seulement la médecine, la pharmacie, les soins infirmiers, la science du comportement, la sociologie, la pharmacométrie, la biostatistique et l'économie de la santé. (74%, 3 <sup>rd</sup> )

number of 6–11 experts and of at least 2 rounds (and reasons for conducting more rounds) seem adequate to generate enough answers and reach consensus.<sup>26</sup> Thus, although we observed remarkable dropouts between round 1 and 2 (from 62 to 26 French experts [–52%]; from 40 to 31 German experts [–23%]), the sizes of the panels

remained adequate for all rounds (round 3: 26 French and 25 German experts). A reason for dropouts is that a Delphi survey may be time consuming due to its iterative nature, and the panellists may lose interest in the research study over time.<sup>17</sup> Whatever is the case, we presume much more that the language was a determinant factor.

**TABLE 2** German translation of the ABC taxonomy and corresponding definitions including the acceptance rate (%) after the corresponding Delphi round (2<sup>nd</sup>, 3<sup>rd</sup>) including linguistic validation in German (G), Austrian (A) and Swiss (CH)

English taxonomy	English definition	German taxonomy	German definition
Adherence to medication	The process by which patients take their medications as prescribed.	Medikamentenadhärenz (88%, 3 <sup>rd</sup> )	Der Prozess, bei dem Patienten ihre Medikamente wie verordnet anwenden. (76%, 3 <sup>rd</sup> )
Initiation	The process starts with initiation of the treatment, when the patient takes the first dose of a prescribed medication.	Therapiebeginn (92%, 3 <sup>rd</sup> )	Der Prozess beginnt mit dem Therapiebeginn, wenn der Patient die erste Dosis seiner verordneten Medikation anwendet. (80%, 3 <sup>rd</sup> )
Implementation	The process continues with the implementation of the dosing regimen, defined as the extent to which a patient's actual dosing corresponds to the prescribed dosing regimen, from initiation until the last dose is taken.	Umsetzung (84%, 3 <sup>rd</sup> )	Der Prozess geht weiter mit der Umsetzung des Therapieschemas, definiert als das Ausmaß <sup>a</sup> , in dem die tatsächliche Medikamentenanwendung durch den Patienten dem verordneten Therapieschema entspricht, von der ersten bis zur letzten Anwendung. (80%, 3 <sup>rd</sup> )
Discontinuation	Discontinuation marks the end of therapy, when the next dose to be taken is omitted and no more doses are taken thereafter.	Therapieabbruch (56%, 3 <sup>rd</sup> )	Bezeichnet das Ende der Therapie, bei dem die nächste anzuwendende Dosis ausgelassen wird und keine weiteren Dosen mehr angewendet werden. (72%, 3 <sup>rd</sup> )
Persistence	Persistence is the length of time between initiation and the last dose, which immediately precedes discontinuation.	Persistenz (96%, 3 <sup>rd</sup> )	Ist die Zeitspanne zwischen dem Therapiebeginn und der letzten angewendeten Dosis, welche dem Therapieabbruch unmittelbar vorangeht. (84%, 3 <sup>rd</sup> )
Management of adherence	It is the process of monitoring and supporting patients' adherence to medications by health care systems, providers, patient, and their social networks. The objective of management of adherence is to achieve the best use by patients, of appropriately prescribed medicines, in order to maximize the potential for benefit and minimize the risk of harm.	Management der Adhärenz (96%, 3 <sup>rd</sup> )	Der Prozess, bei dem die Medikamentenadhärenz des Patienten durch das Gesundheitssystem, die Heilberufler <sup>b</sup> , den Patienten und sein soziales Netzwerk überwacht und unterstützt wird. Ziel ist es, die bestmögliche Anwendung der angemessen verordneten Medikamente zu erhalten, damit der Nutzen maximiert und die Risiken minimiert werden. (72%, 3 <sup>rd</sup> )
Adherence-related sciences	This element includes the disciplines that seek understanding of the causes or consequences of differences between the prescribed (i.e. intended) and actual exposures to medicines. The complexity of this field, as well as its richness, results from the fact that it operates across the boundaries between many disciplines, including but not limited to medicine, pharmacy, nursing, behavioural science, sociology, pharmacometrics, biostatistics and health economics.	Adhärenzbezogene Wissenschaften (64%, 3 <sup>rd</sup> )	Der Oberbegriff verschiedener Fachrichtungen, welche die Gründe oder Konsequenzen der Unterschiede zwischen verordneter (d. h. vorgesehener) und tatsächlicher Medikamentenanwendung verstehen wollen. Sowohl die Komplexität als auch die Vielfalt dieses Fachgebiets ergibt sich aus seinem grenz- und fachübergreifenden Charakter; inklusive, aber nicht limitiert auf die Medizin, Pharmazie, Pflegewissenschaften, Verhaltenswissenschaften, Soziologie, Pharmakometrie, Biostatistik und Gesundheitsökonomie. (56%, 3 <sup>rd</sup> )

<sup>a</sup>Ausmaß (G, A) / Ausmass (CH);

<sup>b</sup>Heilberufler (G, A) / Gesundheitsfachpersonen (CH).

Experts who gave up after rounds 1 and 2 might well have spoken fluently French or German. However, they lacked some subtleties of the French and German languages, which were mandatory for re-evaluating previous answers, given that semantic variations in the proposed terms increased from round to round. The fact that the panellists' nationalities of the last round were mainly from nations with French and German as official languages corroborates our assumption.

Perfect agreement among experts is not required for consensus. However, no firm rules exist concerning the cut-off, except that it must be defined in advance<sup>27</sup> and set according to the needs of the performed task.<sup>28</sup> We defined consensus as a predefined percentage of agreement among panellists, which represents a common method to identify a central tendency.<sup>27</sup> Typically, a cut-off value is set between 51 and 100% agreement, with 70% being considered the standard.<sup>29</sup> We adopted a multistage cut-off with 3 levels of consensus from >50 to >95% agreement according to a recent evidence-based guideline.<sup>21</sup>

We performed 3 rounds, which corresponds to the maximal number of rounds beyond which the performance of the panel usually stagnates.<sup>16</sup> Three rounds were considered necessary because round 1 was open-ended that is, new terms and definitions were generated by the panellists.<sup>16</sup> Thus, panellists made a proper choice in round 2 and had the opportunity to reconsider and modify a response—a core element of the Delphi method—only in round 3. Simultaneously, we used an unconventional method to narrow the number of items after round 1 and 2 by excluding items with an acceptance rate of <10%. This allowed eliminating obvious typos (such as *Adhrärenz*) and obtaining a manageable size of items to choose from in the next round. Thus, our number of rounds is coherent and in accordance with other studies that conducted up to 3 Delphi rounds to obtain consensus on translated terms.<sup>30,31</sup>

A significant challenge for panellists was to accept the predefined frame of translation. Some feedbacks mentioned that a translation was correct but did not fit the panellist's understanding of medication adherence or their personal convictions. Thus, a difficulty for panellists might have been not to question the meaning of the initial English terms and definitions. In the introductory text of every round, researchers reminded panellists of this scope. However, personal convictions might explain why 1 French and 2 German terms obtained only moderate consensus after round 3.

We did not ask panellists to make allowances for linguistic precision because we assumed that the translations would occur without using English words in the target language. Thus, we did not control for the potential influence of Anglicism in the panellists' choices. During the Delphi rounds, some panellists noticed Anglicism linked to the French term *implémentation* and the German term *Management der Adhärenz*. In addition, French and Canadian linguists criticised the Anglicism *implémentation*, as its use is restricted to the field of computer science in the French language. Because both terms obtained consensus and withstood the 3 Delphi rounds, we maintained them despite Anglicism. One reason for this decision is that the second-best French term *mise en œuvre* obtained disagreement (an acceptance rate

of 33%) in round 3. The fact that 77% of panellists agreed on the term *implémentation* may be due to its wide use in daily practice. A further reason is that resistance may occur when researchers and clinicians should use a term that has been theoretically determined and does not correspond to current habits. This would impede our primary goal to harmonise the adherence taxonomy. Finally, the German term *Management der Adhärenz* is broadly used in the German language (i.e. in Germany, Austria and Switzerland), and mentioned in the referenced German dictionary.<sup>32</sup> Beyond political issues, our proposed terms and definitions are likely to serve as references for the entire Francophonie and the DACH-countries.

Our study has several strengths. First, we selected international French- and German-speaking experts in the topic. Second, we developed an online survey that permitted fast answering and opinion gathering without bringing people physically together. Thus, we eliminated any leader influences that are inherent to face-to-face meetings. Third, we required not to question the original meaning of the published terms and definitions. We urged panellists to translate the terms and definitions within the given frame in order to eliminate national and cultural differences in the concept of medication adherence and obtained conceptually identical terms and definitions in the target languages. Fourth, abstention was not possible and there were no missing data. Thus, the conclusions stem from the entire response group and therefore gain reliability. Fifth, we performed a final testing of the translations with monolingual adherence researchers and linguists from different language regions to take cultural differences of the French and German languages into account. Local versions should strengthen the acceptance of the translated adherence terminology in different countries.

We acknowledge some limitations. First, we performed a non-systematic literature search in only 1 database to retrieve synonyms of the 7 terms. Perhaps more synonyms would have been found if the literature search was conducted in a systematic way in >1 database. However, panellists were invited to add personal terms in Delphi round 1. Thus, we claim that round 2 contained all terms needed for the study and that a systematic search method would not have changed the final results. Second, contrary to the 7 terms, we were unable to find their corresponding definitions in French or German literature. Thus, a preliminary translation of the 7 initial definitions was necessary.<sup>31</sup> By this approach, round 1 contained 4–7 different items per term, but only 1 item per definition. This might explain why an overall higher acceptance rate was obtained for the definitions compared to the terms after round 1. Nevertheless, experts also proposed own definitions in round 1 so that a true choice was possible in round 2 and 3. Third, we performed a forward translation for the 7 definitions without backward translation followed by a synthesis and adaptation, which should guarantee cross-cultural equivalence.<sup>33</sup> However, forward and backward translation is recognised when only 2 researchers perform a translation. In our case, much more panellists had the opportunity to adapt the definitions. Thus we claim that cross-cultural equivalence was obtained by heterogeneity of participants in Delphi round 1. Fourth, the original meaning of the taxonomy was not questioned. Consequently, we could have lost panellists eager

to integrate their personal understanding of medication adherence. Fifth, we excluded rated terms and definitions with <10% acceptance before round 2 and 3. Although this voices the choice of very few panellists, we theoretically cannot exclude that these discarded items would have won the consensus process in a subsequent round.

In conclusion, we used a consensus method to translate the ABC taxonomy of medication adherence from English into French and German. The 3 most critical factors for a successful Delphi survey, which are the composition of the expert panel, the number of iterative rounds, and the cut-off set for consensus, were met in an optimal way and guaranteed justifiable, credible and valid results. The translated taxonomy is thought to be used in research, teaching and professional publications and communications. The positive output and impact of having unique medication adherence terms and definitions in French and German languages will be highly determinant for researchers and healthcare professionals. They will be able to standardise their terminology and harmonise their research projects. In the future, we strongly encourage professionals to use the French and German adherence taxonomy in research and academia.

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## COMPETING INTERESTS

There are no competing interests to declare.

## CONTRIBUTORS

Conceptualisation of the overarching research goals and aims: B. Allenet, I. Arnet, A. Lehmann, M.P. Schneider, B. Vrijens, A. Gauchet. Development and design of the methodology: A. Lehmann, I. Allenet. Conducting the investigation process (e.g. creating and conducting the 3 Delphi rounds in French and German): A. Lehmann, M. Haag, B. Allenet, I. Arnet. Formal analysis of results: A. Lehmann, M. Haag, I. Arnet. Supervision of the research project: I. Arnet, B. Allenet, K.E. Hersberger. Writing the draft of the manuscript: M. Haag, A. Lehmann, I. Arnet. Review and editing the manuscript: K.E. Hersberger, M.P. Schneider, A. Gauchet, B. Vrijens.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

## ORCID

Melanie Haag  <https://orcid.org/0000-0002-4226-0359>

Audrey Lehmann  <https://orcid.org/0000-0003-4237-4329>

Kurt E. Hersberger  <https://orcid.org/0000-0001-8678-697X>

Marie-Paule Schneider  <https://orcid.org/0000-0002-7557-9278>

Aurélien Gauchet  <https://orcid.org/0000-0003-1144-403X>

Bernard Vrijens  <https://orcid.org/0000-0002-9090-1253>

Isabelle Arnet  <https://orcid.org/0000-0001-7591-4104>

Benoît Allenet  <https://orcid.org/0000-0002-9989-5101>

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